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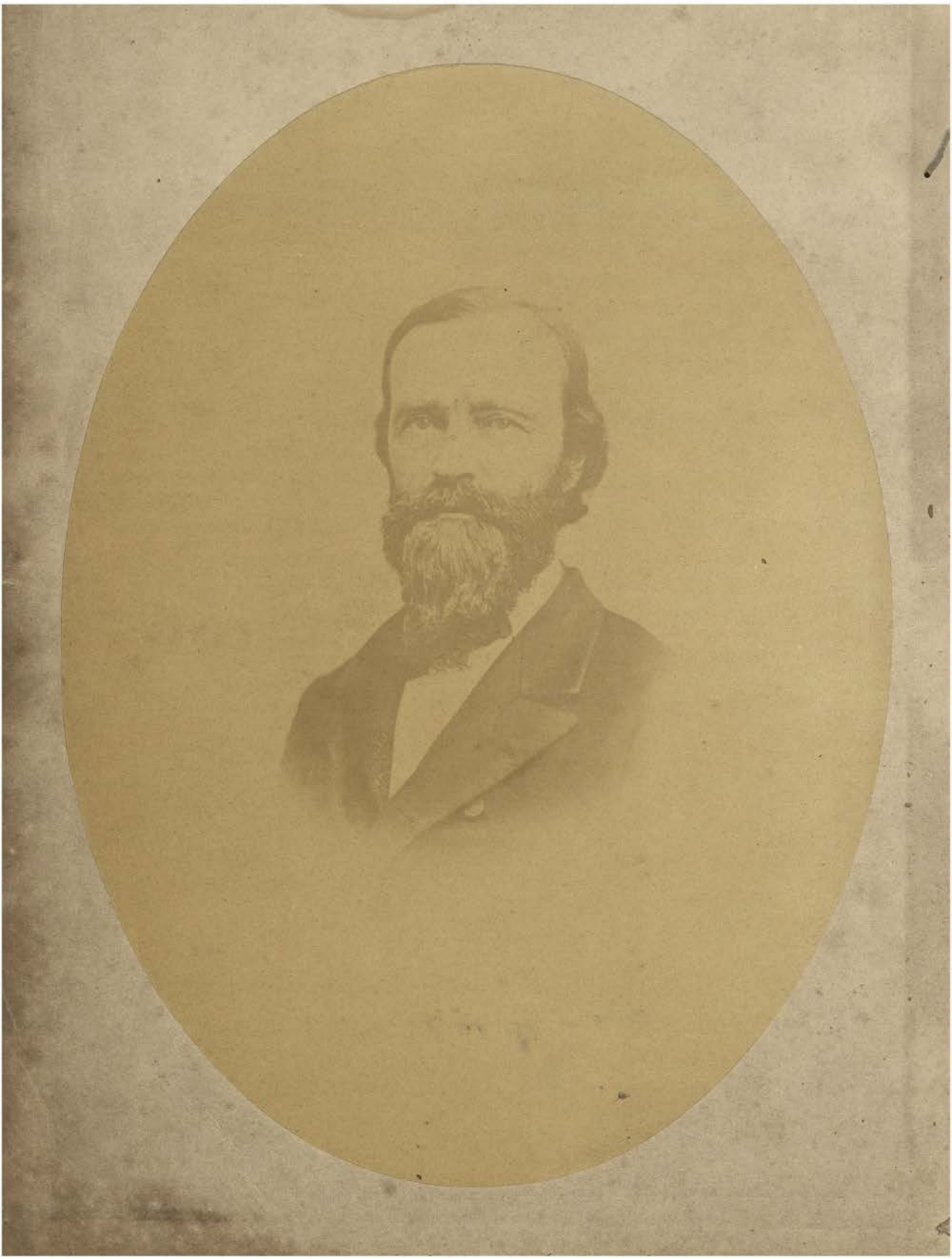

COLORADO:

ITS

RESOURCES, PARKS, AND PROSPECTS

AS A

NEW FIELD FOR EMIGRATION;

WITH AN ACCOUNT OF THE

TRENCHARA AND COSTILLA ESTATES,

IN THE

SAN LUIS PARK.

58947
ac.

BY

WILLIAM BLACKMORE.

LONDON:
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1869.

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Trenchara Estate
Costilla Estate
Trenchara Peak
Costilla Peak
Scale of 80 Chains to One Inch.
Variation 13° 56' East at
San Luis de Culebra.
Map of the
TRENCHARA AND COSTILLA ESTATES
FORMING THE
SANGRE DE CHRISTO GRANT
SITUATE IN
San Luis Valley
COLORADO TERRITORY.

MAP OF THE
UNITED STATES
showing the
PROPOSED RAILROAD ROUTES
TO THE PACIFIC OCEAN
1868
REFERENCE
WASHINGTON
OREGON
CALIFORNIA
NEVADA
UTAH
ARIZONA
NEW MEXICO
COLORADO
WYOMING
MONTANA
DAKOTA
NEBRASKA
KANSAS
TEXAS
MINNESOTA
WISCONSIN
ILLINOIS
MISSOURI
ARKANSAS
LOUISIANA
MISSISSIPPI
ALABAMA
GEORGIA
FLORIDA
SOUTH CAROLINA
NORTH CAROLINA
VIRGINIA
TENNESSEE
KENTUCKY
INDIANA
OHIO
MICHIGAN
PENNSYLVANIA
NEW YORK
MAINE
VERMONT
NEW HAMPSHIRE
MASSACHUSETTS
RHODE ISLAND
CONNECTICUT
NEW JERSEY
DELAWARE
MARYLAND
INDIAN TERRITORY
TERRITORY OF ARIZONA
CHIHUAHUA
SONORA
GULF OF MEXICO
ATLANTIC OCEAN
BAHAMA

MAP OF
COLORADO
CENTRAL GOLD REGION.
GOVERNOR WM GILPIN.
WELD CO.
ARAPAHOE CO.
DOUGLAS CO.
EL PASO CO.
PUEBLO CO.
SUMMIT CO.
PARK CO.
LAKE CO.
FREMONT CO.
CONEJOS CO.

PART I.

COLORADO:

ITS

RESOURCES AND PROSPECTS.

DEDICATED

TO THE

HONORABLE WILLIAM GILPIN,

THE

Founder and First Governor

OF

COLORADO.

AUGUST 2, 1869.

PREFACE.

THE following pages have been compiled with the view of giving reliable information to Emigrants and others, relative to the "TERRITORY OF COLORADO," in the United States of America, and which, in consequence of the recent completion of the Union Pacific Railroad, offers a new, accessible, and desirable field for emigration.

Colorado extends about 300 miles from north to south, and 400 miles from east to west, and contains upwards of 100,000 square miles. It is intersected by two ranges of the Rocky Mountains, and is distant some 2000 miles from New York, and 1,200 miles from San Francisco. Prior to 1859, it had a sparse white population of only a few hundred hardy trappers and pioneers; but gold having then been discovered, a steady immigration set in: so that Colorado now has upwards of 70,000 inhabitants; whilst it ranks next to California as the largest gold-producing district in the United States.

This wonderful progress in population and wealth during the past ten years has been made in spite of the difficulties with which emigrants have had to contend; not the least of which has been the long and wearisome journey across the Plains from the Eastern Settlements to the Mountains of Colorado. The journey across the Plains exceeded 600 miles, and, when taken by mules or oxen, usually occupied from 30 to 60 days, and was often indefinitely protracted. But the recent

Preface.

opening of the Union Pacific Railroad has brought Colorado into direct railway communication with all points of the United States, so that New York can now be reached in four days, and San Francisco in rather more than two. One of the first results of the opening up of railway communication with the West has been the introduction, during the past month, into Central City of upwards of 400 Chinese labourers.

With railway communication to all parts of the United States, the natural progress and prosperity of Colorado in the future is an assured fact; so that there is every reason to expect and believe that during the next ten years this increase will at least equal, if it does not exceed, that of the past decade; the more especially since, in addition to accessibility, agricultural resources, and vast mineral wealth, the upland valleys of Colorado are distinguished by extreme salubrity of climate, which exercises a wonderful restorative and curative effect upon constitutions enfeebled by pulmonary disease.

Civilization and good government in Colorado have advanced equally with its material prosperity; so that Mr. Seward, when recently passing through the West, on his way to San Francisco, was enabled to speak of the country in the following glowing terms :—

"I had thought Colorado was settled with adventurers, a moving "population, and just enough gold '*to swear by*;' but now, to see "this delightful scenery and climate, the substantial and handsome "towns, the intelligence and stability of the citizens—and the large "and rapidly-increasing yield of gold—the farming and pastural "advantages—all surprise and quite bewilder me."

The book is divided into two parts.

The first part consists of a description of Colorado, taken from the best and most reliable authorities; amongst which may be particularly mentioned the official United States Government Report on Colorado, by Mr. Joseph S. Wilson, the Commissioner of the General Land Office, and the Report of the Denver Board of Trade, as well as extracts from the well-known writings of Bayard Taylor, Bliss, Hollister, Whitney, and Bowles. It also refers to mines and mining in Colorado, its agricultural resources, and its great capabilities for the raising of all descriptions of stock.

The second part is devoted to the "Parks of Colorado," and also comprises a series of reports made in connection with two Estates, called the "*Trenchara*," and "*Costilla*" Estates, forming the Sangre de Cristo Grant, and situated in the most southern and best part of the park of "San Luis."

These "Parks" consist of magnificent and fertile upland valleys, lying at an elevation of from 5000 to 6000 feet above the level of the sea, and surrounded by mountains. They are well watered, and are usually heavily timbered on the mountain slopes. The principal and most interesting of the Parks are the "North," "Middle," "South," and "San Luis," the latter of which contains upwards of 9000 square miles, equals the aggregate area of the three former, and excels them in climate, fertility, and mineral wealth.

The Parks, from their extent and productiveness, are capable of supporting a large population, and offer some of the best fields for

Preface.

emigration in the world. Professor Hayden, the well-known geologist of the United States, who has spent the last fifteen years in exploring Kansas, Dakota, Montana, Idaho, Wyoming, and Colorado, in speaking of the southern part of the Park of San Luis, says: "Its fertile soil, "its extensive pasturage, its abundant water-power, its inexhaustible "mineral resources, and the salubrity of its climate, all combine to render "it the most inviting and most promising district west of the Missouri "River, and *I can affirm that I know of no region of the West more "desirable for settlement than this just described, combining, as it does, "all the elements of wealth and productiveness.*"

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DESCRIPTION OF COLORADO.

Corner of F and Blake Streets, Denver

COLORADO.

From Appleton's Hand-book of American Travel.

COLORADO was organised as a territory March 2, 1861. Its area is 106,475 square miles. It lies directly west of Kansas, and comprises the western part of the old Territory of Kansas, and portions of the former territories of Nebraska, New Mexico, and Utah. Knowledge of this region continued very meagre till 1858, at which time mining operations were first commenced. In May, 1859, the famous Gregory mines were discovered, and immigration set in rapidly. The estimated population of Colorado, in 1863, was 45,000, exclusive of 15,000 tribal Indians. The principal pursuits of the people are mining and agriculture. Appleton's Description.

GOLDEN CITY,

The capital of Colorado, has a population of about 1,000. It is situated at the base of the mountains, 15 miles from Denver.

DENVER,

The principal city of Colorado, is at the confluence of Cherry Creek with the South Fork of the Platte River, 13 miles from the base of the Rocky Mountains. It is one of the main points on the great overland line between Omaha and Great Salt Lake, and commands considerable trade and travel. It is distant 580 miles west of Omaha, and 586 miles east of Salt Lake City. The first house in this vicinity was built in the fall of 1857, at a place then called Montana, which was deserted in 1859. Denver, formerly St. Charles, and named after Governor Denver, was commenced October, 1858. The first coach of the Leavenworth and Pike's Peak Express Company arrived May 7, 1859. The city was incorporated November 7, 1860. It now contains about 6,000 inhabitants and several fine buildings, among which are three hotels, two theatres, and two printing offices and newspapers—the *Rocky Mountain News* and *Denver Daily*. The Mint is worth visiting. But the main attractions

Appleton's Description.

of Denver and its locality are the views of the mountains which raise their lofty summits to the west, north, and south. Seventy miles to the south, Pike's Peak, like some old castle, "Majestic though in ruin," lies dim and soft against the sky. The mountain is well worthy to name a noble State. Though not the highest, it is probably the grandest of the whole Rocky Mountain range. The view from the summit is thus described by a recent traveller:—"Eastward, for a hundred miles, our eyes wandered over the dim, dreamy prairies, spotted by the dark shadows of the clouds and the deeper green of the pineries, intersected by the faint gray lines of the roads and emerald threads of timber along the streams, and banded, on the far horizon, with a girdle of gold. To the north we could trace the Platte for seventy miles, while far to the south swept the green timbers of the Arkansas, and then rose the Spanish Peaks of New Mexico, a hundred miles away. Eight or ten miles distant, two little gem-like lakes nestled among the rugged mountains, revealing even the *shadows* of the rocks and pines in their transparent waters. Far beyond, a group of tiny lakelets glittered and sparkled like a cluster of stars."

Forty miles to the north of the town stands Long's Peak, distinct, rugged, and corrugated —its feet wreathed in pine, and its head crested with snow. A dark, irregular, variegated wall sweeps grandly between them, at the verge of the sensible horizon, and beyond, on either side, merges into the dreamy, debatable ground between earth and heaven. The mountains, at the nearest point, ten miles from Denver, afford a view unexcelled upon our continent. Some sixty miles south of Denver, on the road to Pike's Peak, is a remarkable region of natural monuments of stone, which assume various fantastic forms. Upright shafts of rock are standing, over a tract twenty miles in length. Some crowning summits of hills look like immense castles built with perfect symmetry by human hands. But most have the size and shape of gravestones and monuments, and thickly stud the ground for hundreds of acres. Standing in the midst of pine-groves, they give the precise effect of a well-shaded cemetery filled with memorials of the dead. Near Colorado City they culminate in an immense gateway of solid rock, known as the entrance to the Garden of the Gods.

The Southern Colorado and New Mexico Stage Line leaves Denver every Monday, Wednesday, and Friday mornings. Fare to Santa Fé, $105.

A mail hack leaves for the South Park, Blue River, and Upper Arkansas Mines every Thursday morning. Fare, $12 to Buckskin Joe.

BLACK HAWK

Is an important mining town in Gilpin County, 40 miles west of Denver. It contains two churches and numerous schools. Stages connect it with Denver. The *Mining Journal* is published here. Appleton's Description.

CENTRAL CITY,

The capital of Gilpin County, and a mountain mining town of importance, is also west of Denver. It is the centre of the famous Gregory gold mines. A number of mills are in operation here, and large quantities of gold dust are exported. The *Times*, published daily, contains all items of interest to travellers through the Rocky Mountains. The first house was erected in 1859. It now contains four churches, two schools, and a population of 4,000

EMPIRE CITY,

On the North Clear Creek, 15 miles from Central City, is in a rich lode-mining region. Its population is 1,000.

COLORADO CITY

Is near the base of Pike's Peak, on Fontaine que Bouille, a tributary of the Arkansas. It is 100 miles south of Denver.

CAÑON CITY

Is on the Arkansas, 126 miles south of Denver. Pueblo is 40 miles below Cañon City, and 100 miles south-west of Denver.

HAMILTON, MONTGOMERY, AND TORRY

Are situated 100 miles west of Denver, among the south-western lode mines. They are all growing settlements.

Other thriving settlements are found upon the western slope of the Snowy Range Mountains, among the silver mines and the quartz-lode mines of that region.

DESCRIPTION OF COLORADO.

From Bacon's "Handbook of America."

Bacon's Description.

COLORADO was organised as a territory in 1861, from parts of Kansas, Nebraska, and Utah, and applied for admission as a State in 1866. Area, 106,475 square miles. Population, 80,000 besides Indians. State capital, Golden City.

It is intersected north and south by the Rocky Mountains. The eastern half is one vast plain, destitute of timber, with a fertile soil, and divided by many streams. The plains are covered with rich nourishing grass, capable of sustaining millions of cattle. The western half is high tableland, timber being abundant on the slopes of the mountains. "The scenery," says a recent writer, "is the grandest that can be conceived. Two noted mountains, Pike's Peak and Long's Peak, rising to the height of three miles, lift their snowy heads into the heavens; and a circular range of snow-covered mountains reaches from one of these vast spurs to the other; the whole forming a natural amphitheatre, the diameter of which is 150 miles. Strawberries and raspberries flourish at an altitude of two miles; and as I was assured again and again, strawberries can be taken with one hand and snow with the other. Many of the most delicate and beautiful flowers come right up through the snow."

The mineral resources of Colorado are opening up very advantageously to operative capital. The Colorado metals run in beds, mixed with quartz and pyrites, necessitating all the appliances of underground mining, crushing-mills, &c., to render the ores available. This will deter adventurers, to some extent, from settling, but it will call in heavy capital, will raise up large communities, will compel large cultivation of the rich valleys, and thus render the territory, with its magnificent climate, one of the best of regions for the enterprising settler. The mineral deposits are principally of silver, gold, copper, lead, and iron. There are also vast limestone quarries, and an extensive bed of marble. Immense beds of coal have been discovered at the foot of the mountains. Gypsum-beds, also, exist; and mineral springs—alkaline, sulphurous, and chalybeate—most of them so highly charged with carbonic acid as to be designated "boiling" springs. Governor Gilpin, in his report of August 8, 1863, says, "Gold exists in Colorado in inexhaustible quantities. Undoubtedly the State is unequalled in capability of realising mineral wealth." The United States

Commissioner thus speaks of the mines:—"Quartz that yields $12 per ton will pay in favourable localities; but there are veins now worked that yield from $20 to $500 per ton. Mines that barely paid at the surface are yielding enormous profits at a depth of 150 and 200 feet." The returns of the Philadelphia Mint show that Colorado is at present second only to California in the amount of gold coined there, the State having furnished for coinage nearly four times as much gold as any other one of the new States or Territories. The receipts up to 1865 amounted to $80,000,000. Works are erecting at Golden City for the manufacture of railway bars. Extensive mines of iron ore have been discovered there, which will be worked by eastern capitalists, and promise to yield great wealth. Bacon's Description.

The climate of this elevated country is remarkably healthy and invigorating, while the soil is rich and productive; being capable of producing, by the aid of irrigation, corn, wheat, barley, potatoes, oats, turnips, and every kind of vegetable, and of most superior quality. Agriculture and grazing receive some attention in the valleys. The pasturage in many sections is unsurpassed; the grass being exceedingly nutritious, and the dryness of the climate causing it to cure, or become hay, while standing in the field—so that the out-door supply of fodder is abundant through nearly the whole winter.

The chief towns are:—

	Pop. in 1860	Characteristics.
Denver City	5000	Metropolis of Colorado; extensive commerce with the mining regions; various manufactures.
Colorado City	1500	Centre of mining region.

Description of Colorado, from Mr. J. S. Wilson's Report of the General Land Office.

COLORADO: FROM THE REPORT OF MR. JOSEPH S. WILSON, COMMISSIONER OF THE GENERAL LAND OFFICE.

COLORADO TERRITORY is an auriferous region, traversed by ranges of the Rocky Mountains spreading out and enclosing beautiful table lands called Parks, elevated several thousand feet above the sea. The San Luis Park, in the southern portion, is an immense elliptical bowl, the bed of a primeval sea, elevated by volcanic agency. Its bottom, seemingly smooth as water surface, embraces an area of 9,400 square miles. It is watered by thirty-five mountain streams, descending from an encircling rim of snow-capped peaks and ridges, exhibiting a remarkable symmetry of configuration. The scenery, everywhere sublime, presents the ever-varying phases of the kaleidoscope; successive escarpments of terraced hills terminate in an amphitheatre of mountains enclosing an area of 18,000 square miles. Upon their rugged sides the point of cessation of all arborescence is clearly distinguishable, above which the naked granite and snow mark the reign of perpetual winter. The atmosphere is perfectly pure, transmitting the wondrous beauty and variety of the scenery, and the vivid and gorgeous colourings of the sky, iris-like, playing in interchanging lights and shades as varied and copious as the altering angles of the solar rays. There is scarce any spring or autumn, the year being divided between a winter and a summer, both characterised by mildness of temperature and narrow range of barometric and thermometric oscillation. The clouds, incessantly formed upon the crest of the sierras, rarely interrupt the genial sunshine, but refract the rays, clothing the canopy with a silver sheen intense and enchanting. They, however, serve to irrigate the flanks of the mountains, and call into being those immense forests of pine, fir, spruce, hemlock, aspen, oak, and cedar which protect the sources of springs and running streams. These alternate with mountain meadows, covered with luxuriant and nutritious grasses. The depressed elevation of the interior surface of the Park condenses these clouds sufficiently for the growth of grasses, which furnish pasturage all the year round, but not enough for the growth of trees. This elevated region, with pure atmosphere, is eminently salubrious.

The San Luis Park forms a sort of geological cabinet. From the primary rocks, outcropping at the mural summits, to the sedimentary drift, "covered with soil and varnished with vegetation," around San Luis lake, all the elements of the geologic series

Description of Colorado, from Mr. J. S. Wilson's Report of the General Land Office.

seem to be represented. The crevices of the secondary rocks on the mountain sides are charged with richest ores, the source of the golden detritus found in the gulches below.

These deposits become diluted and impoverished as the geologic series ascends and as the slope of the mountain descends. The descending terraces present a fauna and a flora increasing in richness and variety; cereals, flax, vegetables, and fruits flourish upon the plain; sheep and cattle attain superior development upon the hills of luxuriant grass. The products of the dairy, the orchard, and the garden give promise of value yet to be realised by a systematic industry. Beneath the soil is a subsoil of peat which not only moistens the surface, but stores an exhaustless supply of fuel in the very improbable exigency of a final destruction of the magnificent mountain forests. The middle region of the plain forms a crater of twenty miles diameter, enclosed by an almost circular wall or "barranca" five hundred feet high, composed of lava, pumices, calcined lime, metamorphosed sandstone, vitrified rocks, and obsidian. This barranca is perforated by the rivers Rio del Norte, Culebra, and Costilla; corrosive forces have also, in places, broken it into hills. The bottom of the crater is filled with soils, resulting from the abrasion and disintegration of the various strata, brought down by the streams and bevelled to a perfect level. It is of matchless fertility and thoroughly drained by underlying porous formations. Access to the Park is facilitated by natural passes through the mountain rim. Northward are three other Parks, named in their ascending order South Park, Middle Park, and North Park; they are smaller in size and less variegated in beautiful and sublime scenery, yet not unworthy of association with San Luis Park. The remaining portion of Colorado may be briefly described as mountainous, with occasional reproductions of the peculiar features above described. The elements of an agricultural character are as yet variously reported, but unquestioned facts represent enormous yields of cereals from imperfect agricultural enterprise. Sixty bushels of wheat to the acre is a crop well attested in several localities. The mineral wealth of the country is enormous; the yield of gold in 1862 was reported at $12,000,000. Silver has been mined on Snake river which produces $600 per ton. Large tracts of bituminous coal are also reported. The population in 1860 was 34,277; in 1863 it was 80,000; the present population is a matter of conflicting estimates. It is probably near 100,000. The immigration is rapid. The completion of the Pacific railroad will soon enable it to reach a still higher aggregate. Denver City, Central City, Colorado City, and Nevada City are the principal towns. The public lands undisposed of in Colorado are over sixty-two million eight hundred and fifty thousand acres.

Description of Colorado, from Mr. J. S. Wilson's Report of the General Land Office.

The two branches of the Pacific railroad have already advanced along the Platte and the Smoky Hill fork of the Kansas, the Omaha line to within one hundred and eighty miles of Denver City; the Union Pacific, eastern division, to within three hundred miles of that city. As they are being rapidly advanced, with diminishing obstacles, the surveyor-general, anticipating their completion by the end of the present fiscal year, suggests the necessity for extensive surveys of lands falling within the congressional grant in order to fulfil the requirements of the concession to the railroad companies, and submits an enlarged estimate for the next fiscal year, which, looking also to the public exigencies in other surveying districts, has been reduced to $40,000 for field-work.

The mineral resources, particularly of gold and silver, are described by the surveyor-general as very rich, and although the miners have not as yet fully recovered from the effects of the late depression consequent upon reckless speculations and experimental trials of machinery, yet the conviction is prevalent among them that when the mineral wealth shall have been developed, the results will show Colorado to be in this respect second to no other region. Discoveries of coal in large quantities have been made along the base of the mountains, with indications that to the east there is an extensive underlying basin. Nor have agricultural pursuits been neglected during the last year, but, on the contrary, the labours of the husbandman have been crowned with abundant crops of wheat, oats, barley, corn, and potatoes, the supplies being quite equal to home consumption.

COLORADO AND ITS RESOURCES: By J. P. WHITNEY.

Colorado and its Resources: by J. P. Whitney.

THE Mississippi River, the largest in North America, takes its rise in the State of Minnesota, near the extreme northern line of the United States, almost at the geographical centre of the North American Continent, and flows south uninterruptedly through the United States, 3200 miles, to the Gulf of Mexico.

Until within a few years the settled portions of the United States were all east of the Mississippi River, excepting in those States directly adjoining the western side. Thus

an area comprising some 2,000,000 square miles was unknown to the world, excepting from the few vague and uncertain descriptions given by bold and adventurous men who had traversed its unbroken wilds in pursuit of novelty or gain.

The discovery of gold in California, upon the extreme western line of the Republic, first induced active emigration there. The population of that region increased rapidly, and extended northward to Oregon, and eastward to Nevada, in which sections valuable mineral deposits were found. Immense sums have been annually drawn from those regions during the past fifteen years, and added to the currency of the world.

Passages were annually made by teams of emigrants from the settled sections adjacent to the Mississippi River across the country, 1500 miles, to the Pacific coast. By these incursions the interior regions became better known as possessing rich and fertile tracts, admirably adapted for agricultural purposes, accessible, and well watered. This emigration from the eastern and more populous States has been steadily increasing for the past fifteen years, and the result is that the population west of the Mississippi River is now computed by millions, instead of by the few thousands a short time ago, who are now rapidly changing the wild aspect of those regions by the subduing influences of civilisation.

Intersecting the great region west of the Mississippi River, and continuing north in its course from Mexico to British America, is the Rocky Mountain or Sierra Madre Range, which maintains an average distance from the Pacific Ocean, or western limits of the United States, of 700 or 800 miles. Between this range and the Mississippi River, is a tract, 1500 miles in length, by 600 in width, denominated as the great Plains of the United States, devoid of timber, having a fertile and productive soil, and yielding rich herbage for thousands of wild buffalo and antelope, and for the oxen and mules employed by emigrants and freighters. This tract had long been the hunting grounds of numerous tribes of Indians, all of whom having now been driven from the vicinity of the direct route to California, leaves the passage safe. Directly upon the line of travel from St. Louis and Chicago to San Francisco is the territory of Colorado, distant but a few hundred miles from the navigable waters of the Missouri river, the great tributary of the Mississippi, and 900 or 1000 miles from the Pacific Ocean. The territory is between latitudes 37° and 41° north, and longitudes 102° and 109° west from Greenwich, being bounded on the north by the State of Nebraska and the new territory of Wyoming, south by New Mexico, east by Nebraska

and Kansas, and west by Utah. Its average extent east and west is 380 miles, and north and south 280 miles, containing an area of about 111,700 square miles.

The position of the territory is central, and within its limits are the most practicable passes over the mountain ranges, from the Mississippi to Utah, Nevada, and California, and which must be taken as the great highways of the nation, as well as of the world's commerce, as it passes from Europe to the eastern nations of Asia. This will be evident by a moment's consideration of the fact that, upon the completion of the Pacific Railroad through to San Francisco—which, at the present rate of progress, will be completed in three years—mails and passengers will be landed in San Francisco from New York in seven days: add to this ten days consumed by passage from Europe to America, and the twenty-two days' passage from San Francisco to Japan, the average time of the steamers now employed, and we have thirty-nine days as length of passage from London or Paris to Japan: add six days as length of passage from Japan to Hong Kong, and we have forty-five days as total. With an advantage so palpable over the route by the Isthmus of Suez, it is evident that the direct line from New York to San Francisco must be the great route from Western Europe to Eastern Asia, and that Colorado—from its position, its wonderful mineral wealth, its surpassing fertility, salubrious climate, and scenic beauty, its enchanting contrast to the level plains between it and the more populous States east, and the sterile wastes on the west between it and the valley of Salt Lake—must be the great middle station upon the route across the American Continent. The Pacific Railroad has already reached the line of Colorado—800 miles west of Chicago, and 1800 miles distant from New York. It has contracted to build during the present summer 225 miles, which will bring it to the foot of the mountain range in Colorado. Passengers are now carried from New York by railroad in four days to within a distance of 230 miles of Denver City, the capital of Colorado. From the terminus of railroad, coaches and freighting-teams leave daily for Denver and regions beyond.

The discovery by some emigrants, in 1858, of gold upon the shore of the River Platte, near the present city of Denver, twelve miles from the mountains, first drew attention toward Colorado as a mining region. At that time there were no white residents in the territory, excepting a colony of Mexicans, who were located in San Luis Park, in the extreme southern part, engaged in sheep-raising, cultivating the soil to a limited extent, and depending upon the trading settlement of Santa Fé south for their supplies. With this exception, the whole region was wild and unbroken, inhabited in sections by tribes of Indians living in a primitive

Platte Canon to the South of Denver

state, who, drawing from the soil a very scanty proportion of the food required by them, depended almost entirely upon the wild animals abounding in the region. These tribes were constantly in strife with each other, and by their hostile manners prevented peaceful settlements in the region, which they claimed as their hereditary hunting-ground. Colorado and its Resources: by J. P. Whitney.

The discovery of gold, however, stimulated an emigration of hardy pioneers from the eastern section of Kansas, Nebraska, and Missouri, who, going in bodies, were sufficiently strong to defend themselves from any attacks which the Indians could make. These emigrants followed up the different tributaries of the Platte into the mountains, where they discovered a large number of rich mineral veins.

During the years of 1860, 1861, and 1862, there was a continuous stream of emigration to Colorado, which, during the years of 1863, 1864, and 1865, received a material check, owing to a variety of causes, some of which we will briefly review. First, the war unhappily existing in the United States distracted public attention to a great extent from the region; also reports, having their foundation in reality, of the privations and sufferings experienced by the first settlers, were widely circulated through the United States. The long passage, exceeding 600 miles, from the last settlements of the Eastern States to the mountains of Colorado, over a sweeping plain, denuded of timber, and yielding only a precarious supply of food to man, necessitated the taking of supplies sufficient for the through passage. This passage, when taken with mules or oxen, required from thirty to sixty days, and was often indefinitely prolonged by bad weather or by the loss of animals. In such cases—which were not unfrequent—and in others, when the amount of provisions taken was inadequate for the ordinary passage, much want existed, and for a period extending a considerable length over the early days of Colorado, there was a great scarcity of food in the mining regions, and often the worn-out emigrant from the plains arrived to find a condition of affairs but little better there than he had known upon the road. There were also great difficulties met with in working the sulphurets found when the mines were sunk upon below the surface ores, which, though vastly richer than the decomposed ore above them, would not yield the precious metal by the simple and rude process found so profitable when applied to disintegrated or alluvial deposits.

But the great evils which discouraged emigration more than any others, were those entailed by the Indian wars, which raged during the years 1864 and 1865. The different

tribes of Indians upon the plains, who saw the regions they had so long considered exclusively their own continually invaded by emigrants, not slow to resent a real or fancied injury, sank their personal animosities, their heritage, and combined in a general league against their invaders. The opportunity was seized when the civil war in the United States had reached its greatest height, when the Government, requiring all its power, had withdrawn to a great extent its forces from the frontier. The injuries, aggravated by acts of retaliation given and received, inflamed the Indians to more desperate acts of valour and cruelty than they had ever exhibited before. With scarcely an intimation of their purposes they suddenly and simultaneously attacked the route over the plains. Sweeping down upon emigrant teams, and the small settlements which had been established every twelve or fifteen miles upon the route, as stations for the mail and stage lines, they massacred the whites indiscriminately, men, women, and children, often scalping and mutilating the bodies of their victims; the waggons and buildings, after being divested of all that pleased the savage eye, were given to the flames. In one place, for a distance of 150 miles, the route was made desolate. From other places the inhabitants and emigrants were driven to central spots, where, for days, they were besieged by their savage foes. The military station at Julesburg, where a considerable number of troops were congregated as well as emigrants, was surrounded for a number of days by a large body of Indians, who, cutting off communication in every direction, made desperate efforts to obtain possession of it, and were only repulsed by the use of canister and grape.

The number of Indians engaged in these outrages was from 10,000 to 15,000, though at the time the number was supposed to be larger, as the tribes to which these Indians belonged comprised some 30,000 warriors. The condition of affairs in Colorado during these difficulties was aggravated by the expectation of attacks from other tribes than those engaged upon the plains, who were living in the mountain regions adjacent; but, fortunately, those tribes maintained a peaceful attitude.

In the meantime, troops were sent from the east, and volunteer companies were organised in Colorado from the hardy miners, who scoured the plains in all directions, and soon opened the route. But the vigilance and activity of the savages prevented their being punished to any considerable extent. In one instance, however, a large body

of them were surrounded when encamped near a stream, not a long distance from Denver City, when from 400 to 500 of the Indians were killed.

During this condition of affairs, although the mail and stage lines were open almost all the time, and passages of combined bodies of emigrants were regularly and safely made, prices for the necessaries of life rose to a height previously unknown in the territory. Corn, oats, and other grains sold at from 20 to 25 cents per lb.; potatoes from 5 to 15 cents per lb.; flour, butter, and other articles of food sold at prices correspondingly high. Freight across the plains to the territory readily commanded an average price of 10 cents per lb., in some instances reaching 25 cents per lb. The natural result in Colorado was an increase in price of labour, which could not be obtained at less than from $5 to $10 per day. During those years mining languished, and at least half of the miners who had emigrated to the territory in previous years left it for the new mining regions still farther west, which had their communications with the States of California and Oregon upon the Pacific coast.

But despite the high prices and Indian difficulties which prevailed, a large emigration set in during the summer of the year 1865, which was encouraged by the protection afforded by Government in placing 10,000 troops upon the route from the Missouri River to Salt Lake.

A large number of the emigrants who crossed the plains in 1865 were *en route* for regions beyond; but the amount of freight received in Colorado during that year exceeded that of any previous one, and a large number of settlers were added to the population of the territory. The protection afforded by Government has been found sufficient to give entire safety to the route over the plains, and to the regions beyond, which are now being rapidly settled, and any fear of serious difficulties with Indians has passed away. The emigration over the plains during the year 1865 was immense. Government alone paid a sum exceeding $6,000,000 for freight across the country to its various western military stations. The amount of freight which was carried over the plains in 1865 is estimated to have exceeded 150,000,000 lbs.

From 15,000 to 20,000 teams were employed in the passage, some of which made two trips to the mountains during the summer, the average amount of freight carried

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by the teams being 5,000 lbs., each team having from four to six horses or mules, or from six to twelve oxen. The writer, while returning east over the plains by stage in 1865, counted, in three days, 3,384 teams of this description, all passing westward; the distance made by the stage during this time being 320 miles. At one point upon the route there passed westward, by actual count, in 60 days, 9,494 teams, having over 58,000 head of horses, mules, and oxen. The emigration of 1866 was large and steady, uninterrupted by Indian raids, the savages having been driven far away from the routes. The plains, though free of timber, are well watered, and covered with a rich soil, which yields a heavy-bladed grass of the most nutritious quality, and from which the cattle employed in freighting to Colorado acquire a fatness which well fits them for the market, This grass grows in a native state to a considerable height, and could be cut for hay by thousands and millions of tons. Antelopes in large numbers are found upon the plains. also rabbits of large size, wolves, ground squirrels, grouse, snipe, curlews, &c. Immense herds of buffalo roam annually over the expanse, at times so plentiful as to prevent or days the passage of teams. At some seasons, they can be seen by thousands and tens of thousands, strung out over an area of from 50 to 100 miles in width. The Indians slaughter them in large numbers, and, after taking from them favourite strips of meat, leave their immense bodies, weighing from 600 to 1,000 lbs., to be eaten by wolves, or to decay upon the ground.

POPULATION AND SETTLEMENTS.—Colorado now contains a population of 36,000, exclusive of Mexicans and Indians. The capital, Denver, is pleasantly situated upon the banks of the Platte River. To the westward of this city, twelve miles distant, the mountains rise abruptly from the plains. These ranges of mountains can be plainly seen from the north to the south for 200 miles, presenting one of the grandest sights imaginable. The foot hills, rising moderately from the plains, give to the eye an appearance of cultivation, seeming to have been cut by the hand of man into the shapes they present: here trimmed upon the sides and rounded to the top with perfect evenness; again, cut midway from a horizontal surface line with mathematical accuracy. Rising evenly beyond, are higher hills, girt with walls of rock, which, shooting up perpendicularly for hundreds of feet, seem like embattlements ready to belch forth the crashing weight of iron upon the vales below. Succeeding are ranges of mountains piling in upon each other, until they culminate in white peaks, which rise to an altitude of from 14,000 to 16,000 feet above

tide water. These are the beacon lights of welcome to the traveller upon the Plains, long before he refreshes himself at the sparkling streams of the foot hills which they supply.

Denver contains a population of from 7,000 to 8,000. Its streets are regularly laid out, and it has many blocks of substantial brick stores. It has seven churches, two large seminaries, a number of common schools, and one theatre; three daily and two weekly newspapers; a national bank, and numerous banking houses. A branch of the United States Mint is also established there. It has a number of large hotels, and many good restaurants, from which can be obtained all the varieties of meat, fish, wild game, and vegetables. The expenses of living in Denver are not, at the present time, higher than in any of the large western cities. It is by far the most advanced and comfortable place of residence between the large cities of St. Louis, Chicago, and San Francisco.

No city could well be more pleasantly located, or blessed with a more genial climate, never experiencing the rougher storms met with in the mountains above, and having in the summer a mild and uniform temperature. The water from a point upon the river above the city is turned to flow as required through the streets, giving strength to the many trees which have been set out, and freshness to gardens of flowers or vegetables. Denver is the great trading and outfitting station of the Rocky Mountain regions, and is destined to be the great central depôt of the different railroads now building. Golden City, at the foot of the mountains, and thirteen miles from Denver, has a population of 1,500, and commands the most practicable passage to the mining regions from the Plains The town is divided by a rapid stream, furnishing an unlimited amount of water-power, and is in the vicinity of immense deposits of iron-ore, fire-clay, and coal, which are being rapidly developed under the direction of eastern capitalists, who have properly estimated the great value of their possessions.

To this point will a great bulk of the ores from the mountains above be brought for smelting. An act of incorporation has been obtained for building a railroad to the mines, which can be completed at a moderate expense. A newspaper is published there, and many fine buildings are being erected; near by are very fertile tracts of land, a portion of which are under cultivation.

Twenty-two miles above are the mining towns of Black Hawk, Central City, and Nevada, these towns being, in fact, a continuation of settlements. They contain a population of from 6,000 to 8,000, and have two weekly and two daily newspapers, good hotels, schools, stores, repairing shops, and all the conveniences required in mining. They contain many mining mills, and in Black Hawk are the smelting works lately introduced. The mines in the vicinity of these towns have been more extensively developed than in any other part of Colorado, and many of them are now being worked to great profit. The amount of gold taken out of them from June 1, 1866, to January 1, 1867, exceeded by 400 per cent. the amount taken out during the preceding six months.

Within a radius of fifteen miles from Central City are the towns of Idaho, Spanish Bar, Georgetown, Elizabeth City, Empire, North Empire, and the settlements in Boulder County all of which are active and growing towns, connected by good roads, and in the vicinity of rich mines.

GOLD.—The localities in which gold is most plentifully found are in the counties of Boulder, Gilpin, Clear Creek, Jefferson, and the extreme south-eastern part of Summit. Although it is evident that many other sections of the territory contain gold-bearing veins, no great amount of attention has been bestowed upon them, and the principal amount of mining that has been done has been in the counties of Gilpin and Clear Creek.

The gold veins proper, found wholly in granite formation, vary in width, from a scarcely perceptible streak, to forty and even fifty feet, but seldom averaging over four or five feet. When discovered from the surface, the vein is indicated by a light porous quartz, discoloured by the oxidation of base metals, in which small particles of gold are disseminated, sometimes in the form of small scales, fine dust or stringy pieces, but seldom in masses of any size. A few dozen pieces, averaging from half an ounce to a pound and a half in weight, were exhibited in the Colorado Department at the Exposition, comprising some of the finest pieces ever obtained in Colorado, which has rarely given specimens of this character.

The value of veins are usually determined by the miners, by crushing to a fine powder, in a hand mortar, a few pieces of surface ore, the powder being carefully washed with water in a hand pan. This consists in giving the pan a peculiar motion, which settles the gold at the bottom; the fine particles of earth and quartz being carefully floated off. It is seldom

that surface ore is found so poor as not to exhibit from a few pieces so treated a streak of fine gold dust at the bottom of the pan. From some veins, pieces can be readily found, by a little search, showing specks of gold up to the size of pin-heads. Some surface ores are so rich that with a hand mortar and pan, and a few pails of water, from $3 to $10 per day can be obtained by one person. Sometimes streaks of white and yellow earths are found in surface ores which yield from $5 to $60 to the panful of twelve or fifteen pounds. When such streaks are found, large amounts are often obtained from them. The surface ore, generally quite soft and porous at the top, gradually grows harder and more compact as it recedes from the oxidising effects of the atmosphere, and is finally lost in the glittering sulphurets of iron and copper which take its place, being equally rich in gold, and oftentimes a vast deal richer, having in addition a per-centage of silver, and oftentimes an amount of copper equivalent to twenty per cent. of bulk. The surface ore, when found in veins of ordinary width and richness, is stripped from the veins until the sulphurets are met with, and is submitted to the ordinary process of amalgamation, on large copper plates, coated with quicksilver, or in large iron or wooden pans, the ore being scoured by revolving spars of iron, or masses of stone. In this manner surface ores are made to pay good profit, and in some instances very large amounts.

The tracts containing gold veins, designated as belts, seem to have a uniform course north-east by south-west, cropping out in some localities, and then disappearing from the surface to be found beyond in their continuation. The number of veins that are found in some localities is astonishing. In some districts they are found succeeding each other with such regularity that it is not an exaggeration to say that they may be counted by the hundred in the space of a mile. In places, by some natural convulsions of Nature at an early period, they are broken and distorted from the regularity which marks them elsewhere, and for acres in extent the surface of the earth is discoloured by the peculiar blossom which indicates the presence of sulphurets below. Such tracts, when water can be brought to them, are sluiced to great profit. A tract of this description is now being sluiced in Upper Union District, Clear Creek County, water having been brought in a ditch from a long distance for the purpose; and from $20 to $30 per day per man employed is obtained by the parties engaged; and there are many other localities in the territory where large amounts can be obtained in the same manner, when, by a combination of interests, water can be brought to hand.

Many alluvial deposits, which contain gold, are also found in the territory, some of which have been sluiced to advantage, but of which the greater portion remain untouched.

A peculiarity of the Colorado gold veins is, that they are invariably found richer the deeper they are sunk upon. This rule seems to be without exception, and in no instance is a vein lost, excepting by a break off in the adjoining formation. Gold is not found to any great extent in a free state, after leaving the surface ore. The great per-centage of the precious metal is found intimately associated with the sulphurets of iron, copper, silver, lead, antimony, and arsenic. Iron predominates over the other metals, often comprising from thirty to forty per cent. of the crevice matter. Copper is almost invariably represented, and few veins show less than from three to five per cent. of this metal, and many exhibit from fifteen to twenty per cent. This metal increases almost invariably as the veins are sunk upon, showing a tendency to assume the form of sulphate as it descends. In the copper—particularly the sulphate—is found the greatest per-centage of gold, often giving an assay exceeding $2,000 to the ton of 2,000 lbs.

Miles of shafts have been sunk and tunnels run in Colorado; but no single shafts or tunnels have yet attained any great depth.

The deepest shaft, so far sunk, is upon the Burroughs lode, in Nevada District, Gilpin County. This has attained a depth of 525 feet, and exhibits ore altogether superior to anything previously discovered in this lode, which has given between $3,000,000 and $4,000,000 taken from other shafts sunk upon it, none of which, however, have been sunk to a depth of 300 feet. The ore taken from the deepest shaft is now yielding, in an ordinary stamp and pan mill, a sum three times larger than that expended in mining and treating it, and by assay shows that scarcely twenty-five per cent. of the gold contained in it is saved by the amalgamating process.

Shafts have been sunk upon the Gold Dirt, Bobtail, and Gregory lodes, to a depth of between 300 and 400 feet, in every instance exhibiting ore of surpassing richness. The great majority of shafts, however, from want of means, and from ignorance of the true method of treating the ores found, have not been sunk more than sufficiently deep to demonstrate the value of the lodes they are upon.

The gold-mining regions are easily reached from the Plains below, and are connected by good roads. Streams having sufficient water and fall to furnish unlimited power for mining purposes, are plentiful. The valleys and agricultural lands, though less sheltered and productive than those upon the western side of the range, or on the Plains below, are sufficiently fertile to furnish more than a much larger population can consume. Timber, also, is plentiful; and the climate, though uncertain in its temperature, during the summer, is not attended in winter with that severity which is peculiar to the Atlantic sea-coast towns of the same latitude.

Within the last year a considerable quantity of ore, taken from several mines, was freighted across the Plains to the river, and forwarded to Swansea, in Wales, that it might be experimented upon by the skilled experience employed there. No difficulty was found in working the ore in Swansea, which gave yields of between $200 and $300 to the ton; the same ore not yielding over $10 or $15 to the ton by the stamp and pan mills in Colorado, yet paying a profit from that amount.

No accurate estimates can be made of the amount of gold obtained from Colorado, particularly during the earlier days, owing to the irregular methods of remitting in vogue; but probably not less than $30,000,000 have been obtained within the limits of the territory from 1859 up to the present time—not a large amount, when compared with the yields from other more advanced mining regions during the same time, but a large sum considering the small number of people engaged in obtaining it, their isolation from settled regions, their Indian difficulties, and the destructive influences of the civil war raging at the same time in the United States.

SILVER.—This metal is found in all the gold-mining districts of Colorado, associated with the ores containing gold; in the galena particularly, which is found at times in considerable quantity. It is always present, but not sufficiently plentiful to be a feature of value in the gold mines; yet large masses have lately been obtained by the smelting process from ores considered strictly gold-bearing, and it is quite evident that in the future, with the advantages of improved processes, this metal will be freely obtained. But not until within the last two years was it generally known in Colorado that immense belts of silver veins, separate from the gold, existed upon the western declivities of the Rocky Mountain Range, corresponding in their direction and general features with

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those of gold upon the eastern side. The prevailing great richness in silver in the ores of Griffith and Argentine districts, in Clear Creek County, upon the head-waters of South Clear Creek, some thirteen miles distant from the towns of Central and Black Hawk, and correspondingly near to the snowy peaks of the range, first attracted particular attention to the element of silver. In these districts silver ores of great richness have been discovered, masses being exhibited at the Paris Exposition from the Baker lode of Argentine District, and of the Elijah Hise and Indigo lodes of Griffith District, which assay respectively in silver alone $532·12, $1,656·20, and $1,804·83 to the ton of 2000 lbs. of ore. These veins were followed to an altitude previously unknown in mining experience in Colorado. Enterprising men were soon engaged in prospecting the regions corresponding upon the other side of the range, which resulted in the discovery of immense deposits of rich argentiferous galena. The black sulphurets of silver, antimonial silver ore, rich chlorides, ruby silver ore, and pieces of native silver, were found, and a new region, the extent of which has not yet been determined, was thrown open to the attention of all those who might have the curiosity to examine it.

Much excitement was occasioned in Colorado by this discovery, and a large number of prospectors were soon engaged there in making discoveries and pre-emptions under the liberal laws of the territory, which gave undisputed possession to discoverers who should have their claims recorded in the county office, after making the developments and improvements required by law.

That portion of the silver region first opened is situated in Summit County, upon the head-waters of the Snake and Swan Rivers, which flow into the Blue River, a tributary of the Rio Colorado, which flows into the Gulf of California. An examination of the region a few miles south-west, in the neighbourhood of Ten-Mile Creek, another tributary of the Blue, led to the discovery of still more wonderful exhibits of mineral wealth than were found in the Snake River region. Veins of great width and prominence were found, which, in some instances, could be distinguished by their discoloured surface ores, when miles distant, seaming the mountain-sides like gigantic roads, measuring from twenty to fifty feet in width. In this region, the result of violent volcanic action is evident by the great height of many peaks, their abrupt and broken sides, and by the immense masses of lava and scoria which abound. Not far distant are hot saline and sulphur springs, as well as deposits of dry salt.

The belief in increasing richness upon the continuation northward of the mineral regions of Mexico, has been expressed by the most eminent authorities, Humboldt, Ward, and Glennie, who have given us so much information upon the subject, and the theory is universally believed in Northern Mexico. South, scarcely 350 miles from the border-line of Colorado, is the State of Chihuahua, in Mexico, which, undoubtedly, contains the richest silver mines ever worked in the world. Adjoining Chihuahua, are the mines of San Dimas, where one individual paid in his lifetime 11,000,000 of Mexican dollars, or one-fifth royalty, upon the amount obtained by him from two mines. Intervening between Chihuahua and Colorado, upon the right and left, are the territories of New Mexico and Arizona, the latter famous for its mineral wealth, but comparatively unexplored, and inhabited by hostile Indians. From this territory have been obtained the largest masses of native silver ever found in the world. One mass, weighing 2700lb., was carried to the City of Mexico, and the evidence concerning it is well substantiated by the records of the Royal Fiscal. North of Colorado, in the territory of Wyoming, silver nuggets have also been found; yet no settlements of whites are in the territory, and no mining has yet been done there. Still farther north, upon the continuation of the range, are the wonderfully rich mines of Idaho, which have been developed but to a very limited extent, but have produced silver ores unequalled for richness. At the Paris Exposition were five pieces of ore from this region; one a mass of ruby silver, weighing over 200lb., which gives an assay of over sixty per cent. pure silver; the other pieces, in the aggregate weighing from 600lb. to 800lb., being chloride ores, and assaying from twenty to forty per cent. of pure silver. The evidence is positive and conclusive of increasing mineral wealth from Mexico northward upon the Rocky Mountain range. North from Chihuahua continues the Rocky Mountain, or proper Sierra Madre range, exceeding all its other exhibitions of volcanic action in Colorado. By its immense upheavals of lofty mountains and high table-lands—since we depend upon volcanic action for our mineral ores—it presents the best possible arguments for attention; while the wonderfully rich and inexhaustible mines, which have been so lately discovered there, rivet our stronger interest.

Fletcher Mountain in Ten-Mile District, where the richest mines yet discovered are found, may be designated—if the application is a proper one—the predominant peak or water-shed of the continent. From each side of this mountain rise streams—Gilpin and Clinton—which, flowing into Ten-Mile Creek, empty into the Grande and

then into the Rio Colorado, in fact, being the head-waters and origin of that great stream, which, originating at an altitude of over two miles above tide water, in a region teeming with mineral wealth, seeks the shores of the Pacific through a region which is one vast field of metallic treasure, but which lies deserted, neglected, and comparatively unknown.* Upon the western side, near the base, are numerous rivulets, emptying into the Blue, another tributary of the Rio Colorado. Southward from Fletcher Mountain a few miles, so near Ten-Mile Creek that the waters almost mingle, rises the Arkansas River, flowing into the Mississippi. To the south, not many miles farther, rise the head-waters of the Rio Grande del Norte, flowing into the Gulf of Mexico. At the south-eastern base of Fletcher Mountain rises the South Platte River, which, striking north, circles over the great plains, irrigating the soil in its passage, and supplying water to the tens of thousands who yearly make their migration to the promising lands of the Far West.

During the short time which has elapsed since the discovery of the silver-mining regions, good roads have been made, connecting them with the more settled sections of the territory; from the Snake-river mines to Denver by way of Breckenridge, the country seat of Summit County, and from Ten-Mile District to Denver, by way of the Arkansas River and the South Park. In both sections, a large number of shafts have been sunk upon the principal veins to a depth of from twenty to sixty feet, some of which have exhibited an abundance of rich ore. In Ten-Mile District, miners were engaged during the past winter—in the employ of eastern capitalists, who subscribed a large sum for the purpose—in driving a tunnel from the base of Fletcher Mountain to its centre, for the purpose of ascertaining, from ore taken at a great depth, the true value of veins which presented such indications of wealth upon the surface. This tunnel, commencing at a height of about sixty feet above the water-line of the district, had been driven in February through the solid rock—of which the mountains, beneath a thin coating of earth, are almost entirely composed—to a depth of about 200 feet, and will be steadily prosecuted until it reaches, at a depth of from

* The descent of this stream, until it reaches a distance of about 600 miles from the Gulf of California, is quite rapid. In one locality before reaching that point, this river buries itself in an immense cañon, worn in the earth by the impetuous speed of its boiling waters. For a distance of 200 miles it is almost hid from the light of day by the beetling cliffs and perpendicular walls which rise above it to a height of from 1,000 to 5,000 feet, and which will ever be effectual barriers to an acquaintance with its mysterious passage.

600 to 800 feet, a large vein, known as the "Campton," which exhibits upon the surface, for over a mile in length, a crevice which has a uniform width of ten feet, and which has given, from shafts sunk upon it, some of the richest ore obtained in the district.

From the silver mines of Summit County seventy-six assays were made during the past year by Albert Reichenecker, a graduate of the Polytechnic School of the kingdom of Wurtemburg, and who served the State Government of that kingdom nine years as chemist and engineer of mines, who obtained an average assay of $121·64 to the ton of 2,000lb.; and deposed that said ores taken for assay were only a fair average of the ore from the mines from which they were respectively taken, and that they came from a depth not exceeding twenty feet, and in most cases from within five feet of the surface.

From thirty assays made by Fred Eckfeldt, melter and refiner at the United States Branch Mint at Denver, an average assay was obtained of $130·28 to the ton of 2,000lb.; Eckfeldt deposing that the ores so assayed were but a fair average of the mines from which they were taken.

The silver-mining regions abound in many streams, which have their sources in the immense masses of snow found always upon the high mountain-peaks. These streams, being fed by thousands of small rivulets and springs, gain in a short distance great force and volume, giving unfailing freshness to the rich grasses, flowers, wild fruits, and lofty trees found in the valleys they traverse.

At a height of 12,000 feet in these regions timber disappears, though rich pasturage and flowers are found growing close to the banks of snow. Strawberries are often found growing in great abundance far above the timber line, as well as raspberries. The timber, above an altitude of 8,000 or 9,000 feet, is principally fir and spruce, which is quite abundant, and grows to a great size. The native grass is of an extremely nutritious quality, and for hay cannot be excelled. It grows high and vigorously, and in the valleys and parks can be cut in great quantities. Trout are found in the streams at a height of nearly 12,000 feet, and a variety of wild game is abundant. The climate is less severe in the silver regions than at the same altitudes upon the eastern side of the range, owing to the high mountains which intervene, and which form barriers against the sweeping winds of the Plains. Settlements

are rapidly being made in those sections, and soon they will resound with the busy labour of thousands, who will be required to develop the wonderfully rich and accessible treasures of which now the existence is comparatively unknown.

COPPER.—This metal is found plentifully in Colorado, distributed through all the gold and silver mining regions, and in the mountains surrounding the large parks over the range. Extensive veins of it have lately been found about thirty miles south of Denver, which run through the foot-hills parallel with the belts of gold mines, and which are much richer than any previously discovered, containing a grey ore, which yields as high as sixty per cent. of metal. The metal is generally found in the form of sulphurets in the gold mines, denominated by the miners as yellow iron, and is almost invariably found rich in gold. These sulphurets, in many mines, comprise from ten to twenty per cent. of the ore raised. The deepest shafts which have been sunk in the gold-mining regions exhibit these sulphurets in immense and continuous masses. The sulphate is so plentiful in some ores—often giving an assay of gold of $2,000 to the ton—that after being run through a stamp mill, and exposed to the oxidising effects of exposure, it becomes coated with a thick crust of blue crystallisations. It is sometimes found in a native state, but not in any large quantity. Reports, however, are lately current in Colorado that large masses of it, in a native state, have been discovered upon the surface of the ground, in some remote districts over the range; and that it is plentifully exposed to the eye in the bottoms and upon the sides of some mountain streams flowing into the Middle Park. The element of copper has not yet received any attention in the way of mining; but it is quite evident that it will be found as inexhaustible as the elements of gold and silver.

LEAD—in the form of galena, exhibits itself in many of the gold mines, but diminishes in quantity as the shaft sinks. It is more plentifully found in Ten-Mile District, Summit County, than in any other section yet known. In that district it is, in some instances, found projecting in large masses above the surface of the earth, upon the line of vein, and can be detached in a partially oxidised condition, in pieces weighing from 500lb. to 1,000lb. Upon Fletcher Mountain, thousands of tons could be easily gleaned from the surface; and but a short distance below the surface are large beds, the extent of which has not yet been determined. This galena is never found free from silver, yielding from 10 to 500 ounces to the ton of metal.

From some pieces of galena, fair average ore from a number of veins in Ten-Mile District, the following assays for silver were obtained by Professor A. A. Hayes, State Assayer, of Massachusetts :—

	OZS.	DWTS.	GRS.	
Pyramid vein	81	13	8	per ton of 2000lb.
Merrimac ,, ...	68	12	0	,, ,,
Polygon ,, ...	266	8	0	,, ,,
Hard Cash ,, ...	108	2	12	,, ,,
Blackstone ,, ...	85	18	6	,, ,,
Young ,, ...	65	6	16	,, ,,
Tinsley ,, ...	178	17	0	,, ,,
Siberian ,, ...	106	9	20	,, ,,
Augustine ,, ...	221	3	12	,, ,,

giving an average exceeding 130 ozs. to the ton.

This metal, like copper, has not been mined for, excepting for the purpose of obtaining it to flux other metals with, by the new smelting process.

IRON.—Beds of this ore are found along the base of the mountain in irregular masses, in the form of *limonite*, of a brown and red colour, which yields from fifty to seventy per cent. of metal, containing in addition parts of manganese and alumina. At the head of Smoky Hill Fork there is an enormous deposit of this ore; but no distinct veins have yet been developed. A furnace for working the ore has been erected, but is not running, owing to the large amount of useless machinery sent to the country in 1864 and 1865, which has been broken up and run into new patterns, and has supplied local demands.

COAL.—This is found in profusion upon the plains at the base of the mountains, which argues well for the future manufacturing interests of the region. One-third of the plains in Colorado are estimated to be underlaid with this material. It is also found in the parks over the range; in fact, is universally distributed, except in the mountains, where the formation forbids. The coal so far examined has been found in the form of *lignite*, and that of the parks similar to the *Albertine* coal found in New Brunswick, upon the Atlantic Coast. The veins are found running north and south along the base of mountains, and are

Colorado and its Resources: by J. P. Whitney.

exhibited wherever a mountain stream cuts through the foot-hills upon its way to the plains. The veins so far observed seem to have a width of from three to fifteen feet. The coal is now being used for grates, steam-engines, and reverberatory furnaces, and can be bought in Denver at from $6 to $10 per ton.

PETROLEUM.—In the future, the value to be derived from this material will be large. Inexhaustible quantities can be obtained in a fluid state from the plains, and from the coal found in the parks. Springs are numerous, from which the oil saturates the adjacent ground for hundreds of feet. Scarcely a hundred miles from the northern line of Colorado is a famous natural oil-spring, which steadily yields a flow estimated at from 2000 to 4000 gallons per day, which, flowing for a considerable distance, finally empties into a branch of the Yellowstone River, a large tributary of the Missouri. In the vicinity of this spring are many smaller ones, and, in fact, for a long distance the region is prolific in them, betraying the existence of immense reservoirs below. Some thirty years before the settlement of Colorado, this famous spring was visited and noted by Captain Bonneville, of the United States army, while upon an exploring tour, and has probably continued its flow during the interim. There are no settlements at present within a considerable distance of it, and no attempts are made to take advantage of its value. The only well sunk in Colorado for petroleum gave a yield of thirty-four barrels per day from a depth of seventy-five feet.

SALT.—Deposits of dry salt are found in some parts of the territory, and salt-springs are quite plentiful in the parks. The salt found in a dry state is comparatively pure, and the saline springs contain fully one half-pound of salt to the gallon of water. Some of the springs are very large.

In the South Park extensive works are erected and in operation for boiling and evaporating the brine. The spring from which the works are supplied is some 1000 feet long by 150 feet wide, from the bottom of which the water boils up vigorously.

SUNDRY DEPOSITS.—Alum, fluor-spar, fire-clay, gypsum, lime, manganese, zinc, sulphur, and soda are also found in Colorado in considerable quantities.

ALTITUDES OF SOME TOWNS AND PASSES IN COLORADO:—

	FEET.
Denver City above the sea	4,798
Golden City ,, ,,	5,242
Central City ,, ,,	8,300
Idaho ,, ,,	7,122
Georgetown ,, ,,	8,104
Empire City ,, ,,	8,871
Pass over the Range *viz.* Cheyenne	7,500
,, ,, ,, Berthoud	10,914
,, ,, ,, South Park	11,000
,, ,, ,, Boulder	11,700
,, ,, ,, Jones	12,200
,, ,, ,, Argentine	13,000
North, South, Middle, and San Luis Parks	from 6,000 to 9,000
Main Belts of Gold Mines	,, 7,000 ,, 9,000
,, ,, Silver ,,	,, 8,000 ,, 11,000

CLIMATE.—The climate of Colorado is mild and healthful; between July and October but little rain falls, and not in excess at any time. The air is dry, and somewhat more rarefied than at more moderate elevations; but having great purity, gives speedy relief to those suffering from pulmonic complaints. Meat readily cures without salt when hung exposed to the air. The extreme heat of summer is moderate in its effects, owing to the rapid evaporation of perspiration. In winter the extreme cold felt in the Eastern States is unknown. Cattle remain out during all the winter months, in many of the valleys, exposed to the weather, and leave the best cut and cured hay for that which dries naturally upon the hill sides.

TIMBER, AGRICULTURE, &c.—About one-half of the territory is covered with timber, the growth in some sections being small and scattering, composed of the piñon, or nut-bearing pine, and scrubby cedar. These are confined to the lower foot-hills of the mountains; higher up are found cedar, spruce, fir, and pine, which grow to an enormous size. Hemlock, aspen, and oak are also found. Plum and cherry trees are met with growing wild, and the apple and pear are being cultivated with success. Wild grapes, strawberries, raspberries, and currants are abundant; and heavy growths of wild clover, wild rye, and wild barley cover many of the valleys.

The records of the United States Land Office exhibit sales of 210,000 acres of farming land in the territory, with 190,000 acres claimed, but not paid for; making 400,000 acres under improvement. Of this number, 100,000 acres are well cultivated. The number of acres capable of being brought successfully under cultivation in the territory is estimated at from 5,000,000 to 6,000,000, of which it will be seen that only a very small proportion has been taken, the balance lying in solitude, as it has for centuries, ready to yield, upon the application of labour, those immense crops which are found to leap almost spontaneously from the sections already touched.

Wheat, barley, and oats yield from 30 to 70 bushels to the acre, and all the varieties of vegetables are successfully raised. In 1865, for a number of months, corn and oats sold readily at prices ranging from 15 to 25 cents per lb. In the summer of 1866, grains sold in Colorado at prices less than those ruling in Chicago, Illinois, the largest grain mart in the world. Eight or ten flour-mills are now in operation, which are making more flour than the people of the territory can consume.

TAXATION.—The tax valuation of property in the territory, in 1866, was $10,610,80 a gain of nearly $2,000,000 over the valuation of 1865, and being about $300 per capita. Estimating very moderately the developed mining property in the territory, which is not taxed, to be worth the amount of property which is taxed, we have $600 per capita, or an amount one-fifth in excess of the amount taxed per capita in the United States for the same year. To this should be added a large percentage for the farming improvements which have taken place upon Government lands, of which the occupants have not yet obtained titles, and are, consequently, untaxed.

REVIEW OF MINING PROCESSES AND RESULTS.

IN the counties of Gilpin, Clear Creek, and Boulder—nearly all being in the first two counties—there are 91 stamp mills, containing 1,698 stamps, varying in weight from 250lb. to 900lb. each. There are, in addition, 41 other mills designed for Behr and Keith's, Crosby and Thompson's, Bertola's, Dodge's, Mason's, and processes other than of stamps; also the smelting works at Black Hawk. Many of these mills are fine structures, and can be readily adapted to different methods of working ores. They are mostly built of wood —a few of brick and stone—costing from $3,000 to $100,000. They are nearly all designed

for running by steam-power, the balance by water-power. There are between ten and fifteen mine-pumps in the territory, varying in size from four to nine inches in diameter. There are between forty and fifty steam hoisting rigs over mines, some of which are run in connection with mills, others having separate engines. There are a large number of horse and hand windlasses, and many miles of shafts, tunnels, levels, adits, tramways, &c. Nearly all these mills are in good repair, but many of them are not running at the present time, owing to various causes—the principal ones being that some of the mills are in localities remote from veins which have been sufficiently developed to furnish good ore; in some cases they were erected in the blind haste of ignorant or deceiving men, during the first excitement, outside of the belts of gold veins, the courses of which are now more accurately determined. In many instances, the amounts which were originally pledged, upon the guarantees of the originators of the mining schemes that such amounts would be ample for all purposes, were found insufficient. Sometimes these amounts were increased by farther sums which were oftentimes foolishly expended by incompetent and extravagant agents, in experimenting with new processes, or in building elegant mills, more fitted for boudoirs or saloons than for the purposes of mining. These unwise expenditures by agents, who were far away from their employers, and left to act in accordance with their own ill-matured experiences, often induced a withdrawal of confidence upon the part of the capitalists investing, who at times were so dissatisfied as to abandon the improvements already made for the payment of debts contracted by their agents. But a large proportion of the mills which are quiet are so kept by their owners in anticipation of a still better process than has yet been demonstrated. Many of these owners, well satisfied with their mining property, are engaged in sinking their shafts still deeper upon their mines, and in getting up ore to the surface.

The stamp and pan process, which has been found quite satisfactory when applied to surface ores, has been found deficient when brought in contact with the stubborn sulphurets, from which it takes but a small percentage of the gold known to be contained in them, and having no power to save the silver, which is found in nearly all of the gold ores, or any of the copper, which forms so large a proportion of them. Yet this process has occupied a prominent position up to the present time, from the fact that many of the ores are so exceedingly rich that the small percentage of fine gold contained in them, and saved by the process, has, even in the times of high prices, paid a profit over the expenses of mining and milling. In fact, nearly all the gold obtained from Colorado,

which has not been obtained by sluicing, has been derived in this way; and, in the absence of more perfect appliances, now steadily yields considerable amounts, particularly since the time when the high prices demanded in previous years for labour and the necessaries of life passed away, never again to be known. By this process very large sums have been obtained from the Burroughs, Kansas, Sullivan, Bobtail, Gregory, and other lodes by mill men who have steadily pursued their business, without giving their time and means to the many experimental processes which have followed each other in rapid succession—who, contented with making a daily profit, paid little attention to their ores after they had once passed them through their mills, though well aware of the great wealth still contained in them, depending alone upon the immense masses remaining in their mines which were easily detached and raised to the surface.

The process introduced by Messrs. Behr and Keith, by which the ore, after being finely powdered, is carried by a strong draught through a brick flue, where it is submitted to a great heat, by which the sulphur contained in it is consumed, the iron oxidised, and is then given to the action of quicksilver, has been quite successful in saving a large proportion of the gold contained in the ores; and many ores which have been worthless when worked in the stamp and pan way, have yielded from $50 to $100 to the ton of 2000 lbs. by this process; and tailings from the stamp mills, which have once yielded a good profit over the expenses of mining and milling, are by the latter process made to yield an amount from two to four times greater than that obtained by the first treatment. This process is not, however, calculated to work successfully those ores which contain a percentage of galena in them exceeding 10 per cent.; and as many of the gold veins contain a larger amount, they cannot be treated in this way. It is claimed by this process, that the infinitesimally fine particles of gold contained in the ores are aggregated in small round pellets or globules. This seems to be conclusive, upon an examination of the gold in the desulphurised ore with a magnifying glass. Many of the globules appear to have small concave indentations upon their surfaces, and others appear to have burst open from the natural shrinkage of the metal, when cooling from a molten state. The expense of the process scarcely exceeds that of the stamps and pans, and has the merit of great simplicity.

The ore, after its first reception by the crushing apparatus, is conducted continuously by machinery from first to last, the same being so conveniently arranged that the labour

of four men is sufficient to complete the crushing, powdering, desulphurising, and amalgamating of twenty tons per day. The amount of fuel consumed is small, owing to the large amount of sulphur contained in the ores.

This process does not, however, save any silver or copper, and cannot therefore be considered a perfect method for treating the ores of Colorado. In the hands of the inventors, who expended a large amount before bringing their system to its present condition, it is now paying a large profit. Ores are treated for the benefit of owners in the vicinity at a fixed price, which, owing to the absence of competition, is exceedingly high, being confessedly from six to ten times higher than the actual cost. Yet the amount of ore offered is larger than can possibly be accepted, and in some instances yields to the owners from 300 to 400 per cent. more than the sum paid for treatment. The result attained by Messrs. Behr and Keith has induced a number of parties to imitate their method, who will soon have their mills in successful operation.

The process of smelting ores by the plan pursued at Swansea, in Wales, has lately been introduced into the territory, and though probably far behind the method imitated, owing to the obstacles incidental to the primary application of so delicate a process, in a region where difficulties of every description are met with, has, however, run steadily for a number of months, and turned out masses of bullion weighing from 50 to 150 lbs. The parties having the process in hand have not made public their debit and credit account, and it is therefore impossible to estimate with accuracy their success; but from the fact that they have been constantly augmenting their capacity, and have paid owners of ores sums from four to five times larger than such parties could obtain from them by other treatment, it has been generally conceded that the process is a success. By this process the ore, after being crushed by stamps or other means, is passed into buddles, where the ores are concentrated, the siliceous or sandy portions being thrown aside as worthless. The galena is separated by itself, as well as the copper and iron sulphides. The galena is treated in Scotch hearths, and the sulphides of copper and iron in reverberatory furnaces, the silver and gold being afterwards obtained by cupellation.

The other processes introduced, known as Crosby and Thompson's, Mason's, Dodge's, Bertola's, Monier's, Wilson's, and others, have not yet—so far as the public are informed—attained that success which the enterprising spirit and persistent efforts of their originators

deserve, but have principles of novelty and ingenuity which indicate the success that must ultimately be obtained. To this class of men will the territory finally be indebted for the immense streams of precious metals she will pour out from her belts of mines. Enough has been done in Colorado to satisfy anyone of the true value of the countless and inexhaustible veins which so closely pack and seam her mountain-sides, and the improvements which have been made there in so short a time must appear astonishing to any who will examine them. But the great difficulties which have been encountered must be taken into consideration by those who review her mining processes: the interruptions of the war and Indian difficulties; the long distance, and high rates of freight from the Missouri river, and the delay occasioned in getting the machinery ordered, which, being of novel construction, had to be manufactured expressly for the purpose. But these difficulties are, happily, now overcome, by the cessation of war, by the building of railroads, and by the erection of manufacturing establishments in the territory; and we may reasonably expect in the succeeding few years to see a more rapid and successful advance.

EXTRACTS FROM THE REPORT OF THE DENVER BOARD OF TRADE ON COLORADO.

THE completion of the Union Pacific Railroad to the northern boundary of Colorado; the rapid approach of the Union Pacific Eastern Division—aiming to pass through the centre of the territory; and the commencement of the Denver Branch, to connect with the first-named road at Cheyenne, already affording cheap, rapid, and safe communication with the East, and promising a speedy and direct connection with Chicago and St. Louis, have attracted so much attention to the rich mineral and agricultural resources of the country that it is deemed expedient by the Denver Board of Trade to issue this pamphlet as a brief answer to the numerous letters daily received from abroad, by the Secretary and members of that body. Report of Denver Board of Trade.

DENVER, *May 19th*, 1868.

GENERAL DESCRIPTION OF COLORADO.—Colorado, lying within the central belt through which the emigration of the American people is flowing westward, half-way between St. Louis and San Francisco, has an area of over one hundred thousand square miles, nearly equally divided into plains and mountains.

The plains imperceptibly slope from the base of the mountains, which rise abruptly from them, to the Missouri river; presenting a smooth undulating surface, destitute of timber, save in the valleys of the water-courses, and upon the high land, which, near the mountains, divides the waters of the Platte and Arkansas Rivers.

The climate of this plateau, within the territory of Colorado, is peculiar. Owing to its altitude, remoteness from large bodies of water, and the proximity of the great mountain range, the fall of moisture is small as compared with that of the Atlantic and Mississippi Valley States, and almost wholly confined to the winter and spring months. The summer days are hot, the thermometer often rising to 90 deg., *the nights always cool*

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and dewless. The winters are, as a rule, delightfully mild, interrupted with occasional light falls of snow, followed by a few days only of severe cold. The great climatic characteristic is intense sunshine and absence of moisture.

The soil of the river bottoms is identical in fertility and depth with that of the Missouri, and yields, generally without irrigation, immense crops of small grain, hay, and such vegetables as are produced in the same latitude at the East. The uplands have a rich, warm, sandy loam, which produces, wherever irrigation is possible, even more abundantly than the bottoms, and are everywhere covered with bufialo and gramma grasses, affording nutritious feed for stock, which run at large, and *grow fat without fodder throughout the entire year.*

The innumerable herds of buffalo, elk, antelope, and deer, which have from time immemorial subsisted by pasturage alone, on these plains, suggest that they will not only be capable of furnishing the stock and wool needed for a dense population within the territory, but also for a large portion of the people of the continent.

Spring opens one month earlier here than in the same latitude at the East. Seed is sown in February and March. Teams, subsisting on grass alone, are able to leave the base of the mountains for the East; and, carrying, as it were, the grass with them, reach the Missouri River at the earliest period at which it is possible to travel westward. In short vegetation germinates earlier on the Great Plains, measurably in ratio to the increase of longitude.

Fruit trees, when planted upon the uplands and irrigated, live and grow finely. The soil and climate are identical with those of the Salt Lake Basin, which is—with the exception, perhaps, of certain portions of California—the best fruit-producing region in America, and there is every reason to believe that in time Colorado will, in this particular, rival her sister territory.

Black walnut, chestnut, and other American forest trees grow readily from the seed.

Colorado has richer and more extensive mineral deposits than California, and grazing lands as valuable as those of Texas. She has the peculiar excellences of both these favoured States, with the advantages of easier access and a nearer market. Report of Denver Board of Trade.

The climatic conditions are exceedingly favourable to *consumptives* who are not in the confirmed stage of the disease, to all asthmatic sufferers and to those having chronic bronchitis. *To the latter two it affords instantaneous relief* and rapid and permanent cure.

There is literally no disease peculiar to any portion of the territory, and invalids from abroad rarely fail to rapidly improve under the tonic influences of the climate.

Both to the invalid and voluptuary the contour of surface affords great facility for choice of temperature and density of atmosphere. A ride of two hours over the plains, always hard and smooth, and six hours of mountain travel, either by private conveyance or the six-horse coach, over roads pronounced the best of the kind in the world, and through the grandest of scenery, carries one from the summer heat of the valley, through the intermediate grades of climate, to an altitude where an overcoat is a comfort by day, and a blazing fire a necessity by night. Good inns are found on all the roads, and settlements with public and private houses, having the refinements as well as the comforts of life, hang upon the mountains ten thousand feet above the level of the sea.

Within convenient distance of the mountain settlements, cool streams fresh from the snow, half hidden by flowering shrubs and filled with trout, ripple and foam, and silvery lakes reflect the snow-capped mountains overhanging them. This region is a paradise to the angler and hunter, and it is impossible to do justice in writing to the purity of the atmosphere or to the scenery, in which no element of sublimity is wanting.

Coal.—The coal-fields of Colorado, north of the Arkansas River, have an area of 5000 square miles. The veins vary from five to thirteen feet in thickness, and in places, as on the South Boulder Creek, 23 miles from Denver, eleven, overlying each other, are exposed to view, aggregating from 30 to 50 feet of solid coal. Professor F. V. Hayden, U.S. Geologist, in his report to the Commissioner of the General Land Office, writes of this

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locality as follows: "I spent two evenings at Mr. Marshall's house burning this fuel in a furnace, and it seemed to me that it would prove to be superior to ordinary western bituminous coal, and ranks next to anthracite for domestic purposes. It is as neat as anthracite, leaving no stain on the fingers. It produces no offensive gas or odour, and is thus superior in a sanitary point of view, and when brought into general use will be a great favourite for culinary purposes. It contains no destructive elements, leaves very little ashes, no clinkers, and produces no more erosive effect on stoves, grates, or steam-boilers than dry wood." The same authority, speaking of the central region, says: "When we reflect that we have from 10,000 to 20,000 square miles of mineral fuel in the centre of a region where for a radius of 600 miles there is little or no fuel on or beneath the surface, the future value of these deposits cannot be over-estimated."

The Denver Pacific Railroad will pass within twelve miles of the outcrop of this coal (with which it will have speedy connection by the Coal Creek Valley Railroad), and the return cars can be loaded with this fuel, thus to be distributed through Nebraska and by the Union Pacific E. D., when further advanced, through Kansas, at a cost much less than that of wood at the present time.

IRON.—Iron ore (brown hematite), which yields 70 per cent. of metallic iron, is in close position to the coal-fields above mentioned, and the area over which it seems to abound cannot be less than 50 square miles. Indications of large deposits have been found along the line of the Union Pacific Railroad, and the beds appearing on the Divide—so called—40 miles south-eastward from Denver, are only less remarkable in quantity and richness than the celebrated "Iron Mountain" of Missouri.

Recent experiments show that the mineral fuel can be made useful for smelting purposes, and it is impossible to doubt that Colorado will exert the same influences over the development of the Great Central Region that Pennsylvania does over the contiguous States.

MOUNTAIN REGIONS.—The mountains stretch from north to south across the territory, a distance of 240 miles. The average height is 12,000 feet, though many of the peaks rise from 2000 to 5000 feet higher. The foot hills flank the range on either

hand to a distance of 50 miles; to the eastward subsiding into the plains; to the westward sloping to the base of other and continuous ranges of lesser height, which fill the space thence to the Pacific. This majestic range holds within its folds the North, South, Middle, and San Luis Parks, immense areas of level land—surrounded by snowy mountains—each having a soil, climate, and geological formation peculiar and distinctive. Report of Denver Board of Trade.

The Platte, Arkansas, and Rio Grande Rivers, flowing eastward to the Atlantic, and the Colorada of the West, which pours its flood into the Pacific, take their rise in this range, and from opposite sides of one of its lofty peaks. The climate varies, of course, with the altitude, and is cooler both in summer and winter than that of the plains, yet the mines above the town of Montgomery, at the head of the South Park, at an altitude of 12,000 feet above the level of the sea, are worked in winter without serious inconvenience, and the weekly mails are regularly carried across the range to the miners of the western slope, over a trail 13,000 feet high.

The feature which first attracts attention is the extreme fertility of the valleys and slopes of the mountains. Where not shaded by pine forests, luxuriant grasses, enamelled with flowers, cover the ground as with a carpet, and the entire region affords summer pasturage, especially for sheep, superior in quality and equal in quantity to any other similar extent of wild land in the world.

On the western slope the timber is more dense and vigorous, and wild timothy and clover are added to the other grasses. In the Middle Park, hot sulphur springs of great capacity, possessing valuable medicinal qualities, abound; also thick veins of coal resembling Albertine.

Grain and vegetables are raised without irrigation, at an altitude of 8000 feet, the rains produced by the evaporation of the snow, which usually expend their force before reaching the plains, affording sufficient moisture.

The timber line is about 11,000 feet high, much higher than on other mountains in the same latitude; an apparent deviation from physical laws which is explained by the great extent and general altitude of the inland plateau, of which this range is the

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crest, and which also accounts for the mildness of the winters, which, from the altitude of the country, would else be of more than Alpine severity.

This mountain region contains the mines of gold, silver, copper, and lead which are destined, under the influence of capital and cheap labour, to give to the American people for all time, the monetary supremacy of the commercial world.

The mineral belt extends the whole length of the range, and includes thirty miles of each of its flanks, making an aggregate of fourteen thousand square miles of mineral land. In the two counties of Gilpin and Clear Creek alone, not less than twelve thousand distinct lodes have been discovered and recorded, and it is safe to say that of this number there are not less than one hundred capable of annually yielding, under favourable circumstances, such as the completion of projected railroads will secure, $500,000 each—a total of $50,000,000.

NORTHERN COLORADO.

Besides the two divisions of mountain and plain, another may be made for convenience, viz.: Northern and Southern Colorado; a spur of the mountains jutting out at right angles to the main range, two thousand feet above the general level of the plains, at its highest point, and imperceptibly subsiding into them at a distance of seventy miles, forming the division. This semi-mountainous region divides the waters of the Platte and Arkansas, and includes, on its crest and sides, the extreme western portion of Douglas County. The surface is rolling, everywhere covered with excellent pasturage, and has large forests of good pine timber, sufficient to supply the country east of the mountains with all the lumber needed for many years.

Owing to its altitude, rains are frequent in the summer season, when the plains are perfectly dry; springs of water abound; veins of coal and iron ore, of excellent quality and in vast quantities, crop out in numerous places; and both as an agricultural and pastoral region it has no superior.

COUNTIES.

Douglas County adjoins Arapaho on the south. The remarks on the characteristics of the great plains apply to all of this county, except the extreme western border which is

described in the preceding paragraph. The population is about fifteen hundred, who are principally employed in the manufacture of lumber. The proposed line of the extension of the Union Pacific R. R. E. D. to Denver, bisects this county its entire length, and the road, when built, will open an extensive market for its lumber and coal. Report of Denver Board of Trade.

ARAPAHO COUNTY

Contains the City of Denver, the commercial and political capital of the territory. The South Platte river runs across its western front, a distance of thirty miles, affording an abundance of water for irrigating and manufacturing purposes. The population is about seven thousand, and the valuation of taxable property in 1867 was $4,630,693.

The Platte Water Company's canal, twenty-four miles long, lately completed at a cost of $100,000, supplies Denver with water for domestic purposes, and will irrigate thousands of acres of land in this and adjoining counties, with a capacity for indefinite extension and measure of usefulness. The area of land within the county actually under cultivation is estimated at 10,000 acres. The log cabin of the pioneer settler has given place to the modern farmhouse with its surroundings, and great attention is being paid to all kinds of fruit.

For want of an irrigating canal, farming has to this time been restricted to the river bottoms, but the completion of the irrigating works above mentioned opens an almost unlimited area for cultivation.

To demonstrate the fertility of the soil, it only remains to state that sixty bushels of wheat, sixty-six bushels of barley, sixty-five bushels of oats, and four tons of hay to the acre have been raised.

DENVER

Is beautifully situated on a plain at the junction of Cherry Creek with the South Platte, twelve miles from the foot of the mountains, with an altitude of five thousand feet above tide level. The population is about seven thousand. Men from the East gaze with astonishment on this compactly-built, busy settlement, with the peculiarities to the full of a large city, standing in the "*Great American Desert*," 700 miles from what has hitherto been supposed the *ultima thule* of inhabitable land on the Atlantic slope of the United States.

Report of Denver Board of Trade.

Among the public buildings there are six churches, several of them imposing brick structures, belonging to the Episcopal, Methodist, Baptist, Presbyterian, Congregational, and Catholic societies respectively, two free and several select schools. It is connected with the East, with Central City, and Georgetown by telegraph lines, and is shortly to have the same communication with Santa Fé, New Mexico.

The Catholics have one convent, and the Methodists and Episcopalians each large seminary buildings. There are two first-class flouring mills, run by water, capable of making several hundred sacks of flour per day, two planing mills, sash and door factories; gunsmiths' and jewelry shops, cabinet manufacturers, upholsterers, &c.

There are three daily papers, having also weekly editions, and one weekly paper; three first-class and many second-class hotels, three bridges spanning the Platte, costly and permanent structures, and two over Cherry Creek, erected at a cost of $16,000; two theatres, two public halls, and the United States Branch Mint buildings. Within the corporate limits there is a mile race track, also the half-mile track of the Colorado Territorial Agricultural Society, each having appropriate buildings, and both enclosed with walls of concrete. Six lines of coaches leave every day for the termini of the railroads, for Santa Fé and the various mining towns in the mountains. The view from Denver and vicinity is grand. Pike's and Long's Peaks, with over 200 miles of the snowy range, are plainly visible, and, seen through the clear mountain air, the passing clouds shading, in rapid succession and infinite variety, their seamed and broken surfaces, present a panorama which beggars description, and is pronounced by all travellers unequalled elsewhere in the world.

This scenery, always new and beautiful, looking never twice alike, since it can never be seen twice under the same reflection of cloud and condition of atmosphere, has power to attract again to its contemplation the wanderer, however remote, and so may be said to have an intrinsic value, and claim a place in this publication.

RAILROAD CONNECTIONS.

The Denver Pacific Railway and Telegraph Company was organized under the Laws of Colorado, in November, 1867, books of subscription were opened, and in a single week two

Episcopal Seminary, Denver.

hundred and eighty thousand dollars ($280,000) were subscribed by the business men of Denver. In January of 1868, by an almost unanimous vote, the citizens of Arapaho County voted a subscription of $500,000 to the stock of the company. Report of Denver Board of Trade.

Contracts for the whole road have been made with prominent members of the Union Pacific Railroad Company. Work has commenced. *The grading is progressing at the rate of one and a half to two miles per day*, and it is confidently expected that connection with Chicago will be secured by November, and certainly during the present year.

The Union Pacific, E.D., has reached Pond Creek, 180 miles east of Denver, at which point its government subsidy of $16,000 per mile ceases. The policy of the company constructing that road is unknown, but there is no doubt that St. Louis, Cincinnati, and Philadelphia, which are to be benefited by its extension, will at an early date push it through to Denver, and beyond to a connection with the main line.

The completion of the Branch R. R. from the U. P. R. R. during the summer, as contemplated, will give an immense stimulus to the growth and business of Denver. Already a flourishing town before a rail had been laid upon either of the Pacific roads, and steadily growing, in spite of the disasters of Indian wars, failure of crops and mining processes, her future, when the projected roads shall be accomplished, and cheap labour and capital engaged in developing the wonderful resources of the country of which she is the commercial and money centre, promises to be brilliant indeed.

The United States and Mexico Telegraph Company, with a capital of $1,000,000, lately organized under the General Incorporation Law of the Territory, for the purpose of constructing a telegraph line from Denver, *via* Colorado City, Pueblo, Trinidad, and Fort Union, to Santa Fé, a distance of 430 miles (and eventually to the City of Mexico), have already constructed 200 miles, and the line is being pushed forward at the rate of five miles per day.

The importance of this enterprise to Denver can hardly be over-estimated; it will place her in closer relation to the rich southern country, and increase the extensive and lucrative trade she already controls. It will also compel the establishment here of the military headquarters of the Department of the Plains, as the most convenient point at which communication can be had with all its important posts.

Report of Denver Board of Trade.

The Arapaho, Jefferson, and South Park Railroad Company, also organised under the General Incorporation Law of the Territory, has projected a narrow-guage road from Denver to the mining region, for the purpose of bringing the ores to the coal-fields of the plains for cheaper reduction, and for the cheaper transportation of the coal, building stone, and lumber used in Denver. About one-third of the capital required for the construction of the first and most important section of this road is already subscribed.

Denver has all the necessary elements for the growth of a great city, viz., extensive and fertile fields for agriculture, convenience for manufacturing, a great and increasing market for its merchandise and products, and a salubrious climate.

GILPIN COUNTY

Is the most famous as it is the best developed of the mountain counties. Black Hawk and Central City have a population of about 7,000 souls, dwelling upon the narrow banks of an affluent of Clear Creek.

The two towns may be classed as one, for the line of separation is only imaginary. There are two banks, two newspapers, several fine churches, and many fine brick and stone buildings.

One hundred mining companies have been formed in the eastern cities on lodes within a radius of two miles of Central City. Their improvements sum up as follows: 65 stamp mills, containing 1210 stamps in running order; eight mills, containing 390 stamps on the ground; and at Atchison, Kansas, not erected, 26 mills with reducing works, other than stamps, most of them magnificent structures; 181 engines, with an aggregate of 4500 horse-power; 14 mine pumps, ranging in size from four to ten inches; engine, shaft, and whim houses, whims and windlasses without number, and, on five of the principal lodes, shafts aggregating in depth 20,000 feet, with levels and inclines amounting to as much more. These lodes have been opened lineally on an aggregate of 12,700 feet, and during the past year the banks of Central City have shipped east $1,200,000 worth of gold.

CLEAR CREEK COUNTY.

Is only less famous than Gilpin because less developed. It has numerous and rich gold mines, and the silver lodes discovered upon the main range within the last two years, and

only now partially explored, are so rich, numerous, and extensive that alone they would make Colorado a great mining country. Report of Denver Board of Trade.

These ores are so rich that they have been transported to the Atlantic shore, and there reduced at a profit. Under practical treatment the yield has been $1,000 to the ton, and it is impossible to doubt that Clear Creek will give Colorado a greater prominence as a silver than a gold-producing region.

Georgetown, the principal settlement, having a population of 2,000, is situated upon the stream from which the county is named, directly at the base of the range. It has been built within the last two years, is a brisk thriving place, and promises to be the main depôt in the mountains for distribution of supplies. The water-power which can be obtained from the creek is great, and there is a sufficient area of level ground to comfortably accommodate a large resident population. The town supports one newspaper and several hotels.

JEFFERSON COUNTY

Adjoins Arapaho, and includes within its limits agricultural and mineral lands, the mountains and the plains, and the fertile valley of Clear Creek, one of the richest in the territory. Golden City is the county seat, and is located upon Clear Creek where that stream leaves the mountains. The immediate vicinity of Golden City is rich in deposits of coal and iron. There are six coal mines opened and worked. The deposits of fire-clay are of great value, and an extensive manufactory of pottery, tiles, fire-brick, &c., is in successful operation. Golden City contains three flouring mills, and other evidences of prosperity.

The taxable property of the county is about $1,000,000, and the taxes $16,365 87.

The flour, feed, and bran manufactured is estimated at	$180,000 00
Beer	5,000 00
Coal	80,000 00
Manufactured goods.....	66,400 00

Population of the county estimated at 2,500.

Report of Denver Board of Trade.

BOULDER COUNTY

Is divided into two equal parts: the western half commencing at the foot hills and extending to the Snowy Range, and contains some of the richest gold and silver bearing lodes in the Territory. The discovery of the richest of these lodes is of recent date, and the work of development has just commenced.

Mills and reducing works are being erected, and every indication promises rich results. The abundance of wood, timber, and water renders this region very attractive and desirable. The eastern half of Boulder County extends from the foot hills easterly fifteen miles along the valleys of North and South Boulder, Left Hand and Saint Vrain, with their tributaries, forming the most densely populated and well cultivated farming region in Colorado.

This whole region, along the base of the mountains, is filled with extensive veins of coal and iron. Some of these veins have been extensively worked, and supply the city of Denver and the surrounding country with coal of an excellent quality.

On the South Boulder is a smelting furnace for reducing iron, the supply of which is inexhaustible and of a superior quality. The population of Boulder County is estimated at 1,700.

SOUTHERN COLORADO

Embraces all that portion of the Territory lying south of the "Divide," or separating ridge, between the waters of the Platte and Arkansas rivers, and includes the counties of El Paso, Fremont, Pueblo, Huerfano, Las Animas, Costilla, Conejos, and Sahwatch, the five first named lying in the valley of the Arkansas, and the three last in the valley of the Rio Grande del Norte.

All that portion lying south of the Arkansas River is what originally belonged to Mexico, and in the organisation of Colorado Territory was taken from New Mexico. It is mostly covered by Spanish grants, and a portion of which has been settled many years. Irrigation is an essential part of farming, and the labour is mostly performed by Mexicans. Very few farms are fenced, the necessity being obviated by the laws requiring stock to be herded during the growing season.

On account of the necessity of irrigation, the farming is confined to the valleys of streams and such table lands as water can be brought to from the streams in acequias or ditches. United States surveys have been made upon most of the lands north of the Arkansas River, and much of it is open to pre-emption and homestead entry, while south of the river the boundaries only of grants have been established by public survey, and the number of acres of each farm or ranche is limited only by the ability of those purchasing from the grantees or the ambition of those "squatting and taking the chances." Report of Denver Board of Trade.

The climate is dry, mild, and healthy. Little snow falls in the valleys during the winter, and up to the present date—March 1st—house-flies have buzzed during every month of the past winter. Stock of all kinds graze and fatten the year round, with no other care or expense than herding, and as the range for grazing is unlimited, stock-growing will always be, as it is now, the most profitable business for agriculturists.

The soil is productive, wheat having been raised which yielded 50 bushels to the acre, and some 100. The average yield of wheat is from 25 to 30 bushels to the acre, and of corn 50.

The average price of wheat and corn is three cents per pound, estimates and prices being made altogether by the pound instead of the bushel.

LAS ANIMAS COUNTY.

This county, with the counties of Conejos and Sahwatch, forms the San Luis Park, a vast elevated basin in the mountains, formed by the valley of the Rio Grande del Norte. This county is bounded on the south by the line of New Mexico, west by the Rio Grande, and east and north by the mountains.

Fort Garland, near the site of the old Fort Massachusetts, is a military post in the northern part of the county, lately commanded by the famous Colonel Kit Carson. The county is finely adapted to agriculture and stock-raising. Wheat, oats, and potatoes are the principal products. Gold, silver, copper, iron, and other minerals are found in the mountains, east and north, and in many places there are indications of these mines having been worked years ago by the Spanish. Population nearly 2,000, mostly Spanish.

CONEJOS COUNTY.

Report of Denver Board of Trade.

This county lies on the west side of the Rio Grande, and is watered by the Rio de los Conejos and the Rio San Antoine. The population is about 1500, mostly Spanish. The county seat is Gaudaloupe, and also the location of the Ute Agency, and one of a dozen or more small towns of Mexican Plazas along the Conejos.

SAHWATCH COUNTY

Is in the upper and north-western end of the San Luis Valley, and on both sides of the Rio Grande. The population is about 250, mostly American. The principal settlement is a German colony under the lead of Captain Kerber. The county contains fine tracts of land, and is mostly public domain, and open for pre-emption and settlement. Recent discoveries of gold in this county are attracting much attention.

All the three last-named counties are perhaps better watered than other arable portions of the territory, and offer great inducements to immigration. The climate is rather too cold for corn, but wheat, oats, barley, potatoes, and other vegetables are raised to perfection. Sheep and cattle are raised and herded in vast numbers, the streams are filled with brook and salmon trout, and the mountains furnish game in great plenty, while a greater number and variety of water fowl are to be found along the Rio Grande than in any other part of the territory. The scenery of this valley is as beautiful as can be found in America, and the region is of historic interest, having furnished the scenes of many a border romance, and is the theatre of the classic age of the trapper life of Kit Carson and his compeers, most of whom now sleep beside their hatchets, beneath the turf of this once "happy hunting ground."

GENERAL REMARKS.

The Pacific Railroad, Eastern Division, has surveyed a branch road deflecting at a point about 100 miles east of Denver, so as to strike the Arkansas River at the mouth of the Las Animas, or Huerfano, and thence direct through Southern Colorado to Santa Fé and Arizona, to the Pacific. The time is not distant when a railroad will run parallel with the mountains, at their base from Denver, *via* Santa Fé to Mexico. Coal-fields skirt the

base of the mountains from the northern border of Colorado to Trinidad. Few efforts have as yet been made to cultivate fruit, but of the adaptation of the climate to fruit culture there can be no doubt. Currants, plums, raspberries and grapes grow spontaneously in immense quantities. A superior quality of native wine is made from the wild grape, and the dryness of the atmosphere prevents the liability to mildew. Pueblo County alone manufactured last year from the wild grape over 100 barrels of native wine.

Report of Denver Board of Trade.

The following summary of the products of the southern counties exhibits the resources of that portion of the territory, and is as nearly correct as can be obtained. The data for the products of the northern counties were not attainable except by rough estimate, and are not therefore presented, but will probably nearly equal those of the southern counties :—

SUMMARY OF PRODUCTIONS.

Counties	Corn, bus.	Wheat, bus.	Cattle, hd.	Sheep, hd.	Hogs.
El Paso	15,000	10,000	2,000	1,000	500
Fremont	10,000	11,900	1,000	500	250
Pueblo	500,000	100,000	10,000	20,000	1,000
Huerfano	100,000	50,000	6,000	5,000	500
Las Animas	50,000	100,000	8,000	15,000	500
Costilla		20,000	5,000	20,000	
Conejos		15,000	2,000	10,000	
Sahwatch		5,000	500	1,000	
Total	675,000	311,900	34,500	72,500	2,750

The United States Land Office, located at Denver, furnishes the following as the amount of land entered at that office during the year 1867, viz. :—

M. B. Land Warrants, Acts of 1847, 1850, 1855	46,306 acres
Cash Series	9,545 „
Homestead Entries, Act May 20th, 1862	11,603 „
Filings made and settled upon, about	70,000 „
Total	137,454 acres

(Signed) E. C. HOLMES, Registrar.

There are two other Land Offices in the territory, from which no report has been received.

Report of Denver Board of Trade.

PRICES OF PROVISIONS AND LIVING.—Bacon, hams and sides, 25c.; lard, 25c.; butter, 65c.; coffee, 35c.; corn, 4c.; meal, 5c.; flour, $6 to $9 per 100lbs.; potatoes, 3c.; sugar, 25c.; syrup molasses, $2 to $2 75 per gallon; teas, $2 to $2 50; beef, 12½ to 20c.; board, per week, from $5 to $10.

PRICES OF LABOUR.—Ordinary farm hands obtain from 30 to 60 dollars per month; mechanics from five to eight dollars per day; servant girls from seven to ten dollars per week, and all classes of labour are in good demand.

Governor John Evans, in his Message to the Legislature in 1864, thus compares the profits of farming in Colorado and Illinois:—

One man will attend, by his own labour, in Colorado, ten acres of corn and fifteen acres of wheat, which, at the average prices since the country has been settled, yield as follows:—

10 acres corn, 40 bushels per acre—400 bushels at $3 00	$1,200 00	
15 ,, Wheat, 30 ,, ,, ,, —450 ,, at 3 00	1,350 00	
Corn fodder for 10 acres at $10 per acre	100 00	
Wheat straw for 15 acres—20 tons at $10 per ton	200 00	2,850 00

In Illinois one man will cultivate thirty acres of corn and fifteen acres of wheat which, at the general average of crops and prices, would yield:—

30 acres Corn, 60 bushels per acre—1800 bushels at 20 cts	$360 00	
15 ,, Wheat, 15 ,, ,, ,, — 225 ,, at 75 cts	168 75	
Straw fodder estimated at	100 00	628 75

Showing a profit on one man's labour in favour of Colorado of $2,221 25

ROUTES OF TRAVEL.—The Chicago and North Western Railroad from Chicago to Omaha connects with the Union Pacific Railroad at that point. A daily line of packets runs from St. Louis to St. Joseph. The Union Pacific Railroad is completed to the Rocky Mountains. The Denver Pacific Railway will connect with that road at Cheyenne. Daily stages now run from Cheyenne to Denver. The Union Pacific Railroad, Eastern Division, is completed to Antelope—200 miles east of Denver—and is being rapidly constructed towards Denver. This road connects at Kansas City with the Missouri Pacific Railroad,

the Hannibal and St. Joseph Railroad, and the North Missouri Railroad, and the packets upon the Missouri river, affording prompt communication with Chicago and St. Louis. The United States Express Company run regular daily coaches from the end of the road to Denver. The Nye Forwarding Company advertise that they have over 200 teams, and connect with the great U.P.R. Eastern Division at its western terminus, *via* Smoky Hill route, thus forming a direct and reliable line of transportation from St. Louis, Philadelphia, Pittsburg, New York, Boston, Cincinnati, Chicago, and all points east, through to Denver City, Colorado. Report of Denver Board of Trade.

The Denver and Santa Fé Stage and Express Company run a tri-weekly line of coaches from Denver to Santa Fé through all the principal towns of Southern Colorado, and to the new mines on the Cimarron.

A correspondent of the Department of Agriculture in Pueblo county, Colorado, writes as follows upon the agriculture of that territory: "Permanent settlement and agricultural operations first commenced here in 1860, but little progress was made until two years later, since which time no country has ever improved faster; every available foot of land in this county being now occupied and cultivated as closely as in any part of the United States. Every foot that can be watered is being turned by the plough. There are now fifty-three ditches in use in this county, their aggregate length being 147 miles, at a cost of $91,400, and if the cost of dams, breakages, repairs, &c., was estimated, it would swell the amount to over $100,000. The actual number of acres already ploughed is 21,150. Considering the insulation and newness of the country, and that not a foot can be cultivated without being irrigated, I think it will be hard to find a parallel. On the first day of June, 1867, there had been entered and pre-empted at the land office in the territory 400,000 acres, and a little over 100,000 are cultivated by 'Spanish grant' holders; and about 50,000 acres are cultivated where the land is unsurveyed and unentered. So that there are nearly 600,000 acres now under the plough in the territory."

THE AURIFEROUS REGIONS OF AMERICA.

Extracted from the "New York Herald," of January 23rd, 1865.

THE AURIFEROUS MOUNTAIN REGIONS OF NORTH AMERICA.

Auriferous Regions of North America, from the "New York Herald."

To familiarise the uninitiated mind with the auriferous mountain formation of this country, and to make it susceptible of comprehending what we shall presently have more particularly to offer in the same connection, we will give a brief outline, collated from the best attainable authorities, of the mountain plan of North America

The Andes, having traversed the whole length of South America, passing out from the Isthmus of Tehuantepec, continue to follow, unchanged in character, the Pacific shore of North America, clear up to Behring's Straits. Known successively as the Cordilleras (link or chain) of Anahuac in Mexico, Sierra Nevada (Snowy Mountains) in California, and Cascade Mountains in Oregon, it is all along the same auriferous and volcanic Andes, having a narrow base, washed on the west by the tide, immense altitude, summits of perpetual snow, and formed of the columnar vulcan rock, or molten mass of lava. Between this continuous escarpment of rock and the sea is the maritime region of the Pacific, which contains all the present American population residing in California and Oregon, upon the smaller rivers running directly into the sea and parallel to one another. It resembles and is the counterpart of the maritime Atlantic declivity, which is shut off from the valleys of the Mississippi and St. Lawrence by the Alleghanies. At the Isthmus of Tehuantepec the Andes bifurcate, throwing along the coast of the Mexican Gulf the great Cordillera of the Sierra Madre, which, opening rapidly from the Andes as the continent widens, and assuming in our territory the name of Rocky Mountains, traverses north to the shores of the Arctic Sea, being some fourteen hundred miles apart from and to the east of the Andes. The absolute separate existence of these two prodigious Cordilleras must remain distinctly in the mind, if the reader intends to understand American geography. The interval between them, from end to end, is occupied by the plateau of table lands on which are alike the cities of Mexico,

Chihuahua, and the Mormon city of Salt Lake. This plateau of the table lands is two-sevenths of the surface of North America, is some 6000 feet above the external oceans, and gives as complete a separation between the Cordilleras on the flanks as does the Atlantic, whose waters roll between the Alleghanies on this continent and the Alps in Europe. Thus that side of the American continent which may be defined to front Asia, and sheds its waters in that direction, has, then, four characteristic divisions—the maritime front, the Andes, the plateau of the table lands, and the Sierra Nevada—all extending the whole length, from south to north, parallel to one another, and covering in the aggregate two-fifths of its whole area. The remaining three-fifths of the continent sheds its waters towards the Atlantic. From the Sierra Madre the whole continent descends to the sea by immense planes, resembling the glacis of a fortress, or a flattened octagonal house-roof. Thus, from the dividing wall on the Sierra Madre the continent descends uninterruptedly to the Gulf, the North Atlantic, and the Arctic seas.

Auriferous Regions of North America, from the "New York Herald."

THE CONFIGURATION OF THE SIERRA MADRE.

The configuration of the Sierra Madre (the mother mountain of the world) is transcendently massive and sublime. Rising from a basement whose roots spread out two thousand miles or more, its crest splits almost centrally the Northern continent, and divides its waters to the two oceans. Novel terms have been introduced to define its characteristics: *mesa* expresses the level plateaux of its summits: *canon*, the gorges rent in its slopes by the descending rivers; *bute*, the conical mountains isolated and trimmed into symmetrical peaks by atmospheric corrosion. The core or base of the Sierra Madre is red porphyritic granite, from the immense naked masses of which comes the popular soubriquet of "Rocky" Mountains. This is the gold-producing quartz. The Sierra Madre is composed of the original mass of the globe, and has neither lava, craters, active volcanoes, nor traces of the igneous force within. It is pre-eminently primeval. Scooped out of its main mass are valleys of great size and beauty, which have received from the trappers the name of "parks." These occur at regular intervals, alternately upon either flank, and mark the sources of the great rivers. But as those remarkable valleys are beginning to attract the adventurous, the wealth and the wonder seekers of the world, we will reserve a further description of them for an especial chapter.

Auriferous Regions of North America, from the "New York Herald."

The Cordillera of the Sierra Madre enters our territory in latitude 29 degrees, longitude 103 degrees, and passes beyond the 49th degree in longitude 114. Its length, then, within these limits, exceeds 1,600 miles. It maintains an average distance from the Mississippi river exceeding 1,000 miles, and has the same distance from the beach of the Pacific Ocean; it forms, therefore, a continuous summit crest parallel to and midway between them. The mountain crest has, when seen against the horizon, the resemblance of a saw or cock's-comb, whence the soubriquet Sierra; the continuous mass upon which it rests resembles a chain of links, or a cord with knots, whence the name Cordillera. The average elevation of the crest is 12,000 feet above the sea; breadth across, 300 miles.

THE GRAND FEATURES OF THIS CORDILLERA.

This Cordillera is auriferous throughout. It contains all forms of minerals, metals, stones, salts, and earths; in short, every useful shape in which matter is elsewhere found to arrange itself, and in all the geological gradations. The prominent agricultural feature of the Cordillera is pastoral fertility. Stupendous peaks and battlements exist, extreme in bald and sterile nakedness; plains there are blasted with perpetual aridity and congealed by perpetual frosts. But the space thus occupied is small. Indigenous grasses, fruits, and vegetables abound; it swarms with animal life and aboriginal cattle; food for grazing and carnivorous animals, fowls, and fish, is everywhere found; the forests and flora are superlative; the immense dimensions of nature render accessibility universal. An atmosphere of intense brilliancy and tonic tone overflows and embalms all nature; health and longevity are the lot of man. Then we must reflect that the Cordillera of the Sierra Madre is but a third part in area of our "mountain formation."

Without dwelling further at this time upon this topic, we will proceed to a brief description of an immense area of country as little nown to the American people as was America itself by the people of antiquity, and that is

THE PLATEAU OF NORTH AMERICA.

This area contains within itself three great rivers, which rank with the Nile, the Ganges, and the Danube in length, and five great ranges of primary mountains.

The whole immense area, encased within the cordillera of the Sierra Madre on the east, and the cordillera of the Sierra Nevada de los Andes on the west, and from Tehuantepec by the Polar Sea, is the plateau of North America. It is four thousand miles in length, from south-east to north-west; its superficial area is two millions of square miles, and its altitude six thousand feet above the sea. The portion within our territories at present is one-third of the whole country.

Auriferous Regions of North America, from the "New York Herald."

CLIMATE AND PRODUCTIONS OF THE PLATEAU.

The climate of the plateau is peculiar, but very uniform. The genial and propitious climate of the isothermal temperate zone extends up and down the summit of the plains, and is felt at both extremities. The soils of the plateau are of the highest order of fertility. The dry and serene atmosphere converts the grasses into hay, and preserving them without decay, perpetuates the food of grazing animals the year round. Meat, food, hides, wool, fowls, fish, and dairy food are of spontaneous production. Spots of arid sand are few and insignificant; such as exist are from the auriferous granite, and contain placers of gold. The whole vast area is surcharged with gold. A perpetual, sure, and systematic irrigation dispenses with laborious manual tillage. In short, the plateau presents itself prepared and equipped by nature in all departments, at every point, and throughout its whole length, for the immediate entrance and occupation of organized society and the densest population. Accessibility to the plateau is wonderfully facile and unobstructed over a tranquil ocean on the one hand, and by the great plains on the other. The success of the Mormon settlement and other flourishing communities upon the plateau, and the facility with which large armies have been transported through it within a few years, demonstrate the capability of the region to sustain a dense population. Infinite is the assemblage of mountains, plains, and great rivers in every variety and magnitude that unite themselves to form the grand area of the plateau of America. The features of its geology are equally various, vast, and wonderful; both mountains and plains promiscuously appear, of carboniferous and sulphurous limestones, lava, porphyrite, granite, columnar basalt, obsidian, sandstone, accompanied by their appropriate contents of precious and base metals, precious stones, coal, marbles, earth, thermal and medicinal streams and fountains, and all of these adorned by scenery for ever varying, fascinating, and sublime.

THE ISOTHERMAL TEMPERATE BELT OF THE NORTHERN HEMISPHERE.

Auriferous Regions of North America, from the "New York Herald."

The isothermal zone is a belt of equal temperature around the northern hemisphere of the earth, includes all the civilised nations of Asia, Europe, and America, and about 850,000,000 of white people in the aggregage, or nine-tenths of the human race. It is along the axis of this zone continents expand and oceans contract. This zone contains the zodiac of empires. Along its axis, at distances scarcely varying from 100 leagues, appear the great cities of the world, from Pekin in China, to St. Louis in America. The city of New York lies about midway between the borders of this great belt of civilisation. During antiquity this zodiac was narrow; it never expanded beyond the North African shore, nor beyond the Pontic Sea, the Danube, and the Rhine. Along this narrow belt civilisation planted its system from Oriental Asia to the western extremity of Europe, with a more or less perfect development. Modern times have recently seen it widen to embrace the region of the Baltic Sea. In America it starts with the broad front from Cuba to Hudson Bay. As in all previous time, it advances along a line central between these extremes, in the densest form and with the greatest celerity. Here are the chief cities of intelligence and power, and the greatest intensity of energy and progress. In 1820 this middle column of the centre had reached the western frontier of Missouri, and opened trails along to the Pacific sea; the flanks were then behind in New York, Lower Canada, and in Georgia. From 1826 to 1828, politicians interdicted central progress by interposing Indian barriers and "unfriendly legislation." This forced it to recoil, and in the meantime the flanks came up to an even front upon the right and left. But the discovery of gold in California, the opening commerce with Asia, and other great events occurring on the Pacific coast, aroused anew the spirit of central progress, and, within the space of only a few brief years, in its gigantic and onward march over every barrier and obstacle, has peopled savage wildernesses and challenged the wonder and admiration of the civilised world.

THE PARKS OF COLORADO—THE NEW MAGNETS OF AURIFEROUS ATTRACTION.

(Colorado.)

While the grand army of American progress is marching onward and westward, and spreading itself on either flank, we will call the attention of the reader to a temporary halt, for the purpose of examining a region which has been hitherto but little explored

and developed. We refer to the region or system of valleys called the "parks" of Colorado, an excellent map of which we have had expressly prepared for the occasion, and print herewith.

Auriferous Regions of North America, from the "New York Herald." (Colorado.)

There are four parks in Colorado territory. They are, as will be seen by reference to the map, designated the North, Middle, South, and San Luis Parks. The San Luis Park is the most southern. They are of equal size, constituting together a system. They are in close juxtaposition, longitudinally annexed. The resemblance, each with the other, is perfect, yet in the details is observable a variety perfectly infinite. In physical features the San Luis Park is very remarkable. The smooth area is 9400 square miles. The form is very nearly a perfect ellipse, its southerly curve being within the territory of New Mexico. A continuous envelope of mountains encloses it, whose crest everywhere ascends to the line of perpetual snow. It is the bowl of a primeval sea, which has been drained. In configuration this park is the counterpart of the basins of Geneva and Custana, enveloped within the Helvetian Alps. The altitude of the San Luis plain above the sea is 6400 feet; of the enveloping peaks 13,000 feet. Between the circumferent rim of the plain (which is prairie) and the snowy crest, rise undulating mountains of gradually ascending altitude; the flanks of these are gorged by descending streams thirty-five in number. The northern portion—one-third of all—is called "Rincon." Nineteen streams descending, converge into the Sahwatch Lake of fresh water, but having no outlet. These streams bear the name "Alamosos." The remaining area is bisected by the Rio Bravo del Norte, which enters through the western rim and issues out in the south. The plain is continuous as a water surface, having isolated volcanic butes, resembling islands, and an indented rim.

The system of the four parks occupies a parallelogram cut through the centre of Colorado, from north to south, 200 miles wide and 400 long. They reach from latitude 36 degrees and 30 minutes to 41 degrees and 30 minutes. The 106th degree, meridian, exactly bisects them all. The mother Corderilla, sweeping in successive and alternate curves, east and west, divides them one from the other. Each park gives birth to an immense river, departing alternately to the Atlantic and Pacific seas. Here are grouped mountains, parks, and rivers of stupendous dimensions and august sublimity. Spurs of the primary Cordillera curve around to embrace those fronts of the parks from which the great rivers debouch by cañons. These parks have the same level as the great "Plateau of America." They form a part

Auriferous Regions of North America, from the "New York Herald." (Colorado.)

of its surface and assimilate to all its peculiar characteristics. There are parts of it sunk within the bulk of the primeval Cordillera.

Remarking the identity in physical features of the parks thus closely grouped, but the infinite variety flowing from the juxtaposition of altitudes, depressions, permanent snows, running rivers, and the eccentric courses of the mountains and rivers, the details of the San Luis Park offer themselves for specific description. The plain is a drift soil abraded from the mountains and deposited by the currents of the water and of the atmosphere. The eastern half partakes of the qualities of the Cordillera, the western half of the qualities of the Sierra Miembres. The mother Cordillera forms the eastern wall, the Sierra Miembres the western wall of the San Luis Park. The mother Cordillera has a base and flanks of granite slopes inclining inwards as a pyramid, surmounted by stupendous masses of jurassic limestone, carried up, but not destroyed, by the upheaving volcanic forces. Neither igneous plutonic rock nor erupted lava is anywhere found or seen. The Sierra Miembres, a mountain chain of the secondary order, has, in a less proportion, the primeval and sedimentary rocks, but presents the throats of ancient volcanoes, streams of lava, once fluid, and immense pedrigals of igneous and plutonic rocks. The calcareous element, therefore, predominates in the alluvial soil, mixed with silicious and plutonic debris. These elements, intermixed by the action of water and the winds, present to arable and pastoral life a smooth surface for culture and perfect intrinsic fertility.

Here is recognised an atmosphere and climate purely continental. Situated most remote from all the seas, of mountain altitude and encased all around by snowy Sierras, the atmosphere is intensely tonic, salubrious, and brilliant. Summer and winter divide the year, scarcely interrupted by vernal or autumnal seasons. The meridian sun retains its vitalising heat throughout the year, while at midnight prevails a corresponding tonic coolness. The formation of light clouds along the crest of the Sierras is incessant. These are wafted away by the steady atmospheric currents coming from the west. They rarely interrupt the sunshine, but refracting his rays imbue the canopy with a shining silver light, at once intense and brilliant. The flanks of the great mountains, bathed by the embrace of these irrigating clouds, are clad with dense forests of pine, fir, spruce, and aspen, which protect the sources of springs and the running rivulets. With the forests alternate mountain meadows of luxuriant and nutritious grasses.

The ascending clouds, rarely condensed, furnish little irrigation at the depressed elevation of the plains, which are destitute of timber, but clothed in grass. These grasses, growing rapidly during the annual melting of the snows, cure into hay as the aridity of the atmosphere returns. They form perennial pastures, and supply the winter food of the aboriginal cattle, everywhere indigenous and abundant. The critical conclusion to which a rigid study of nature brings the scrutinising mind is the reverse of first impressions. The multitudinous variety of nature adjusts itself with a delicate harmony which brings into concord all the industrial energies—arable agriculture, pastoral agriculture, and all the kindred pursuits of labour which rest upon this foundation and accompany its prosperous vigour. These are burnished, as it were, by the perpetual brilliancy and salubrity of the atmosphere and landscape, whose unfailing beauty and tonic taste invite the physical and mental energies to perpetual activity.

Auriferous Regions of North America, from the "New York Herald." (Colorado.)

In pastoral agriculture there is seen the spontaneous production by nature of meat, dairy food, hides, wool, and kindred elements, sustained as fish in the sea. It is here we find an immense self-sustaining element of food for the human family.

For arable agriculture the area is equally ample in proportion, and of equally propitious excellence. The descending mountain streams furnish irrigation to the plain, whose porous soils receive them to saturation. All the cereals and fruits known to the European people acclimate themselves with the same facility as the people themselves and the domestic animals that accompany them. They receive a similar improvement from the tonic purity of the atmosphere and perennial sunshine. Over an area entirely enveloped by mountains, artesian waters may be everywhere procured.

The streams and lakes abound in fish of great variety and excellence. Water fowl and native poultry, peculiar to the mountains and plains, are everywhere scattered; the swarm of animal life, of the aboriginal kind, and its variety are astonishing. All domestic animals known to our people, when substituted for them, equal them in adaptability and excellence.

For manufacturing in all the departments of food, clothing, and metals, all inducements of facility and economy present themselves. Fuel of wood and coal are accessible. Markets are found in the adjacent active mining regions of Colorado, New Mexico, and Arizona.

Auriferous Regions of North America, from the "New York Herald." (Colorado.)

The San Luis Park extends from thirty-six degrees thirty minutes to thirty-eight degrees forty minutes, and is bisected by the one hundred and sixth degree meridian, very nearly the centre of the territory. It is an ellipse in form, 200 miles in longitude and 75 in breadth. Roads penetrating the surrounding mountains, by easy passes, converge into it from all portions and departments of the external continent. Its whole area is scanned by the eye at one sight from the overhanging mountains. No feature of nature which enters into the composition of scenery, rising to the highest standard of sublimity and beauty, is wanting. A vernal temperature, dissolving tints of light and shade, a translucent canopy intensely blue, a picturesque landscape and fantastic variety of form, blend themselves with the milk-white summits of the mountains to exhibit a panorama for ever fresh, graceful, and fascinating, outrivalling in celestial loveliness the oriental and poetic beauties of the sylvan Valley of Cashmere.

COLORADO TERRITORY DESCRIBED BY COUNTIES.

The most important county in Colorado territory, from its geographical position as the point from which the chief roads radiate to other parts of the great western country, and from the fact that the principal and most populous town in the territory (Denver City) is there located, is

1. ARAPAHO COUNTY.—This county is situated on the eastern bank of the South Platte river, at the point where Cherry Creek empties into the Platte. It contains an occupied or improved area of some six hundred square miles. Denver City is the county seat, and contains about seven thousand five hundred inhabitants. It was first settled in October, 1858. Including Denver, the county numbers from twelve to thirteen thousand inhabitants. Being situated entirely on the plain, Denver is essentially a commercial, agricultural, and manufacturing place. It is the centre of the external commerce of the territory, in which all its important banking business is transacted. From Denver City all the important roads radiate to the different mining districts within the Rocky Mountain region, into all of which there is daily conveyance by coaches. The city is situated 620 miles from Atchison, on the Missouri river, to which there is constant railway communication from the city of New York. The distance from Atchison is travelled in Ben Holliday's celebrated overland mail coaches, upon a fine road, through

a delightful country, and is accomplished in six days. Thus is New York placed within less than ten days' travel of some of the richest gold and silver regions on the continent.

Auriferous Regions of North America, from the "New York Herald." (Colorado.)

2. GILPIN COUNTY.—Next in importance, in population and industrial development, although smaller in area than the county of Arapaho, is Gilpin County, lying to the westward. The principal town is called Central City, containing, with the population engaged in active mining and milling operations in the neighbourhood, about twelve thousand inhabitants. All the active operations in mining, the immediate production being gold, centre in Gilpin County. There are about three hundred and fifty mills of all sizes and descriptions working in the county, connected with the production of gold. Among these are stamp mills of the largest class, driven by steam and water power, and many "rastras" or smaller mills, worked by the current, or by horse, mule, or hand power. Four-fifths of the entire yield of gold in Colorado for the year 1864 (twenty-four millions of dollars) was produced by the Gilpin and Clear Creek mines. This particular region is probably not richer in gold than other portions of the territory, but up to this time it is more fully developed, and every day new mines are opened and the wealth of the district more and more exposed. Gilpin County possesses but little arable soil, the land being uniformly pastoral, and furnishing perennial grasses of a superior quality for the support of cattle and stock. The county contains an area of about four hundred square miles, and includes the prominent mining towns of Nevada, Eureka, Black Hawk, Montana, and Fall River—known as the "northern mines."

3. CLEAR CREEK COUNTY—Contains an area of about eight hundred square miles, and a population of some two thousand five hundred. The chief towns in the county are Empire City and Idaho City, fifteen miles apart. The mining capacities of the county are of the highest order, and are being rapidly developed. A stream called Clear Creek bisects the county all through from east to west, flanked by precipitous mountains abounding in leads of gold-bearing quartz. The abundance of water furnishes innumerable mill sites. There are extensive hot and cold soda springs at Idaho City, near which are also wonderful mines of opals. Precious stones are here found on and near the surface in fabulous quantities; and mines are being opened to aid in the production of the gems still more abundantly. Parties have gathered these valuable stones on casual expeditions by the pint and quart. They are sometimes sold in Central City, or sent eastward, and polished by jewellers and

Auriferous Regions of North America, from the "New York Herald." (Colorado.)

returned. Among the gems found may be enumerated opals, amethysts, onyxs, wine-coloured garnets, rock crystals, and numerous other descriptions. As many as twenty-seven different varieties of valuable specimens of gems have been found in Clear Creek County, all of which are susceptible of the highest polish, and have been cut or wrought by lapidaries into very beautiful personal ornaments. The scenery of this county is everywhere extremely grand and picturesque. Two good roads penetrate the county—one from Denver, the other from Central City—both straight, smooth, and direct. Clear Creek may literally be designated the "Gem county of Colorado."

4. JEFFERSON COUNTY—Is situated intermediately between Arapaho, on the east, and Gilpin and Clear Creek Counties on the west. "Golden City" is the name of the county seat. The population of the county is about 1700, and its area about 750 square miles. The population is in the main agricultural. The county contains immense quarries of limestone and marble, and extensive measures of bituminous coal. There are also oil springs in abundance scattered among the coal beds. A curious feature of this coal is that upon breaking a lump, it is found to be interspersed with particles of rosin in cubes, as found in parts of the piney regions of North Carolina; the result, it is supposed, of the burning of aboriginal pine forests at some remote period. Gold is found in this county in placers along the banks of Clear Creek, which bisects the county east and west, from gold washed down from the mountains in the rear. The towns of Golden Gate, Arapaho, Apex, and Mount Vernon, all agricultural, are situated near Golden City. The coal mines are located around Golden Gate, and around Mount Vernon are mines furnishing lime and plaster and marble. The marble is rose-coloured, similar in appearance to the Tennessee marble, to be seen in rich and elegant display in the Capitol at Washington. Iron ores, intonated with the limestone and coal beds of the Swedish and hematite class, are also found in abundance. Dairy farming is carried on very extensively in Jefferson County, by which Denver and other places are supplied with butter, cheese, and milk, and also with eggs, poultry, fresh meats, &c.

5. BOULDER COUNTY—Is situated north of Jefferson, and contains about the same area. The population is about 1600. The county is the counterpart of Jefferson in nearly all particulars. It contains flouring mills, and a valuable iron furnace is in full blast in it. It also contains salt and chalybeate springs. It is a splendid county for wheat, corn, sorghum, hay, &c. The county contains but one organized town at present, called "Boulder City."

6. LARAMIE COUNTY—Is the next county north of Boulder, and contains the towns of Laporte, San Vrain, and Latham City—the latter named after the California senator of that name. It numbers about 750 inhabitants. In the centre of this county is situated Long's Peak—the most elevated point of the Rocky Mountain system—and is seen in the western horizon 150 miles by those who travel up the Great Plains. In this county agricultural industry is alone developed, although actual exploration has demonstrated that it abounds in minerals equal to the other counties in Colorado.

Auriferous Regions of North America, from the "New York Herald." (Colorado.)

7. DOUGLAS COUNTY—Is located south of Arapaho, its area resting upon the divide between the waters of the Platte and Arkansas rivers. It is remarkable for its immense forests of pine, heretofore the chief source of lumber to the towns and settlements along the base of the mountains, and extending over the plains. Frankstown and Russelville are the principal settlements. The population in whites is small—say some 500. It adjoins a portion of the Indian Reserve, in which Bent's old fort is situated. The soil is eminently pastoral. Minerals have been found in considerable quantities, and the indications are that they exist in abundance. One agate, the length and breadth of a man's hand, and two inches thick, was lately found in this county by an ignorant person who used it as a hammer to repair a horseshoe.

8. EL PASO COUNTY.—This county lies south of Douglas. The population is about two thousand, its area about nine hundred square miles. Its chief town is Colorado City, and includes the highly-developed farming region known as the "Fontaine qui Bouille"—or boiling spring. It also contains the famous and world-renowned "Pike's Peak," towering up like a huge beacon to guide the pioneer to fields of undeveloped wealth and magnificence. Around the base of Pike's Peak, and the vicinity of Colorado City, are natural fountains of soda-water and chalybeate, and scenery wonderful for fantastic form and picturesque beauty. The latter features present obelisks resembling ruins of all sizes and forms, as protruding from the bright green foliage of the forests which clothe the mountain flanks. The productions of El Paso County are exclusively agricultural, including lumber. Everything raised in the States of New York and Pennsylvania can be cultivated and produced in this county. There exists an abundance of wild fruit, including plums, cherries, grapes, currants, raspberries, and strawberries. Orchards of apples, peaches, pears, quinces, and all kinds of orchard fruits, have been planted and are coming forward rapidly. The climate is especially adapted to the luxuriant growth of fruits.

Auriferous Regions of North America, from the "New York Herald." (Colorado.)

9 AND 10. PUEBLO AND FREMONT COUNTIES.—Pueblo City is the county seat of the first, and Carson City of the second. They are 45 miles apart, and both situated upon the north bank of the Arkansas River, which bisects both counties from west to east from its point of issuance below the mountains. These counties and their towns are commanding points upon the high waters of the Arkansas, a river of the first magnitude among those of importance on our continent. The use of this river will always form a prominent thoroughfare or highway across the continent from the middle Mississippi (about the latitude of Memphis) into Mexico, Arizona, and Lower California, upon the Pacific sea. Although navigable only up to Fort Smith, it furnishes a level road a thousand miles in length, and then an entrance into the Rocky Mountains. Its banks are lined with timber and with grasses—the latter expanding indefinitely into the Great Plains. Pueblo County has an area of about 900 square miles, Fremont the same. They are exclusively agricultural as yet. The fertile bottoms of the Arkansas, and the abundance of water for irrigation, constitute these counties the agricultural regions *par excellence* of Colorado. It is here are found an abundance of luscious white and purple grapes, and other native fruits. Wine is made in considerable quantities. The population numbers in each county about 700, or 1400 in both. These counties are open to access all around from the Great Plains, and through them the roads converge toward the west, through the mountain passes at the sources of the South Platte, Arkansas, and Del Norte rivers.

11. HUERFANO COUNTY—Is situated south of the Arkansas River, extending thence to the southern boundary of Colorado territory, and east of the Snowy Sierra. It has about 1200 inhabitants, and contains the celebrated Spanish Peaks, equal in altitude to Pike's Peak and Long's Peak. These peaks are isolated and stand out like islands. Huerfano (Orphan) county has a large area, about 9000 square miles. It is traversed by the rivers Los Animas (Purgatory), Triupas, Apishpa, Huerfano, and San Carlos. It is a fine agricultural region, the borders of the rivers only being as yet cultivated. The Bay of the Great Plains is formed in this county by being enveloped by the Snowy Sierra and Raton Mountains.

12. WELD COUNTY—Is located to the eastward of Laramie County, occupying the entire stretch to the borders of Nebraska and Kansas, and containing the village of Julesburg, recently become of note in consequence of an Indian massacre. Area of the county 8500 square miles, with but a small number of inhabitants—say 450. It is probably the only county where buffalo in any quantity exists. It lies exclusively on the Great Plains, and is

bisected by the South Platte and its affluents, the Beaver, Bijou, Kiowa, and Camanche creeks. The country is peculiarly pastoral, although it contains some arable lands of good quality. It is on the grand highway, with Arapaho, between Atchison, Missouri, and Denver City. Auriferous Regions of North America, from the "New York Herald." (Colorado.)

13 AND 14. SUMMIT AND LAKE COUNTIES—Characterised throughout their area by stupendous mountain chains and peaks, cover the western third of the territorial area of Colorado (or 30,000 square miles), filling the space extending from the Snowy Sierra to the western boundary of the territory, including the sources of the streams which discharge themselves into the Pacific Sea, and the area drained by them. These counties are located entirely upon the elevated plateau of the continent, 7000 feet above the sea, with seductive valleys of parallel dimensions, enveloped by innumerable mountain chains and peaks. Explorations, as yet imperfect, indicate those counties to be the most prolific metalliferous region of the whole mountain system of North America. The salubrious and serene atmosphere, splendid scenery, and infinite variety of productions in mines, agriculture, forests, with abundant streams, seem to blend within these counties every variety of attraction demanded by the advancing column of American progress. No lodgment amounting to permanent occupation has yet surmounted the rigour of the Sierra and found a location within this area.

15 AND 16. COSTILLA AND CONEJOS COUNTIES—Embrace the south-west corner of the territory, having an area of 18,000 square miles. They have received the head of the Mexican column of progress advancing from the south, and have a population of 12,000, mostly Mexicans. These counties include the superb San Luis Park—referred to more particularly above—and the mountain chains of the Sierra Miembres (mountains of osiers or willows), and the Sierra La Plata, or Silver Mountain. The Sierra Miembres are the elongation of those famous mines of Sonora, Chihuahua, and Durango which have furnished the principal portion of the silver used by the world. They abound in gold, but more particularly with silver or argentiferous ores. This area contains erupted volcanic mountains and the formations which include all the precious stones and gems. The most remarkable hot springs exist here. The Pagosa spring is among the most wonderful of the sanitary springs of the world. It is to those springs what Niagara is to other noted cataracts. It is in this region that is reached in perfection the ethereal and propitious atmosphere which characterises the mountain region of our continent, and to which the tide of hardy and adventurous emigration will flow as soon as the alluring beauties and substantial attractions of the Park become known to the world.

AGGREGATE POPULATION OF COLORADO.

Population of Colorado, from "New York Herald."

We append a table giving a recapitulation of the estimated population of Colorado, obtained from personal investigation. It may, of course, be imperfect in some particulars, but, in the absence of any official data on the subject, we believe it to be as correct as any estimate of the kind extant.

RECAPITULATION OF THE POPULATION OF COLORADO BY COUNTIES.

Arapaho County		11,000
Gilpin County		10,000
Clear Creek County		2,500
Jefferson County		1,700
Boulder County		1,600
Laramie County		750
Douglas County		500
El Paso County		2,000
Pueblo County		700
Fremont County		700
Huerfano County		1,200
Weld County		450
Summit County	Unfixed.	—
Lake County		
Costella County	Mostly Mexicans	12,000
Conejos County		
Total		68,100
Less Mexicans		12,000
Estimated American population		56,100

This does not include the population on the Indian Reserve, nor the Indians scattered loose or in tribes throughout the territory.

A GENERAL DESCRIPTION OF COLORADO.

General Description of Colorado, from the "New York Herald."

Through the entire centre of Colorado, from north to south, and lapping up against the indented base of the mountains, are deposits of the primeval ocean—all classing in the geographical series of "secondary" rocks. The contact here of the secondary rocks with the primeval mountains brings into juxtaposition an immense variety of metals, rocks, earths, and salts. Above these, in the mountains, we find precious metals and lumber abounding in infinite profusion. Pastoral agriculture there occupies the whole face of nature. From the crowning summit of the Snowy Cordillera, turreted by the stupendous towers of Long's and Pike's Peaks, descend, towards the two great oceans—the Atlantic and the Pacific—the eastern and western slopes of the American continent. On the east is seen the smooth and gently descending area of the Great Plains, interlaced by rivers. On the west we see the prodigious system of mountains, extending to the Pacific Sea, channelled and drained by immense rivers, which bear off its surplus waters. Surmounting the central barrier of the continent, like the saddle upon the back of a horse, Colorado Territory is pre-eminently the keystone of our continental arc. As in the east, the boundaries of the State of Pennsylvania bestride and neutralize the barriers of the Alleghanies, fusing the Atlantic sea with the Mississippi basin—the same on the west, in the sublime prospective expansion of our immense interior, onward to the great mountains and beyond to the Pacific sea, is accomplished by the supreme and crowning geographical position of Colorado.

The idea of embracing within the boundaries of states and nations massive chains of mountains, instead of causing them to form limits of separation, is here demonstrated in two instances on the American continent. Is it wise to perpetuate the profound blunders of antiquity, which have made for thousands of years the Pyrenees, the Alps, and the Caucasus bulwarks to crush affiliation and make eternal social isolation; or shall we confine these barriers where social unity and energy shall obliterate them as barriers against the fusion of mankind into the grand scheme of civilization and Christianity?

The entire catalogue of metals, salts, and chemicals is found in Colorado, in juxtaposition, or as conveniently arranged as shops are on Broadway—all that is necessary to occupy the industry of man are found, as it were, in a bunch. An area of 80,000 miles is as thoroughly permeated with gold as the waters of the Atlantic are with salt. It is found

General Description of Colorado, from the "New York Herald."

in every form, ore in all its varieties, and pure in the placers. The beds and banks of all the streams sparkle with the priceless deposit.

The aggregate production of gold in Colorado since its first discovery there may be estimated at one hundred millions of dollars. There are probably at least 10,000 mines, constituting actual property, now being worked in the territory. Gold mining is the chief interest of the territory. While in the eastern grain-growing states labour is occupied in the production of the cereals and in manufacturing and commercial pursuits, in Colorado, and in its peerless sisters, Idaho, Montana, and Nevada, the production of gold or silver is the primary object of labour; for with them all the necessaries, comforts, and many of the luxuries of life can be readily purchased.

There exists in Colorado ample evidence that the supply of gold in quartz, placers, and in the beds and banks of streams, is absolutely inexhaustible. Every season, startling discoveries of gold are made in the two flanks of the Cordilleras. Pioneers are magnificently rewarded for their toil and industry. The civil war, instead of diminishing the production of gold, has been the means of bringing it out in Colorado in more abundance than ever, and it will continue to be so as long as paper money shall fail to represent true values, as it does at the present time, and so long as our advancing army of progress aims to secure wealth and self-independence.

The amount of transportation between the Missouri and the Colorado, as the first point of entrance to the great mountain system, is prodigious. The Great Plains represent the ocean between the city of New York and Liverpool. It is no uncommon thing to see as many as 50 wagon teams in one camp, and it is not setting the figure too high to say, that at least half a million of people are more or less interested or engaged in this vast system of intra-continental transportation. New York city is the great Atlantic metropolis from which the bulk of this immense trade flows, and it is to her interest and to the interest of her merchants and capitalists, that every movement calculated to facilitate the means of transit and the development of the resources of these new territories, should be steadily and liberally encouraged.

THE RESOURCES OF COLORADO: By Capt. R. H. LEESE,

Ex-Consul of the U.S.A. for Spezzia.

Extracts from a Series of Letters in the "Mining Journal," of 1868 *and* 1869

DESCRIPTION OF COLORADO.

Resources of Colorado: by Capt. R. H. Leese.

Description of Colorado.

Among the social and political revolutions of the present epoch which are quietly, but surely, acting on and re-modelling the different phases of society, the foundations of a commercial revolution are being laid, the results of which when perfected it is scarcely possible to calculate, or in their effect exaggerate, bidding fair, as they do, to shift the centres of commercial and financial greatness from the eastern to the western hemisphere. The Union Pacific Railroad, now completed, and running nearly 1000 miles, from Omaha, on the Missouri, making 2600 miles in a straight western line from New York, which reduced to time is now ran over in four days, has brought into the uses of the human family the richest agricultural country of the Western Continent, whose mineral resources are fabulous, but in calculating the future wealth and prosperity of this land will be the lowest in the scale. This territory, known on the old maps as the "Great American Desert" (and which will be hereafter designated the Great American Garden), consists of the States of Nebraska, Kansas, and territories of Colorado, Idaho, and Wyoming. Of these the richest in natural resources are Colorado and Idaho; the former of these two is the better known, and now that the branch road from Cheyenne, on the Union Pacific, to the city of Denver is graded, and rails being laid, to be completed in a few months, the heart of this wonderful land will be brought within four days of New York and 15 of London, and it is here that Nature plainly indicates the course of empire will plant the central source of power of the great American nation. To populate this entire region as densely as the State of New York would require 275,000,000 of inhabitants, for whom its area would give four acres of land to each human being. The mountains, wooded far up their sides, arrest the winds, condense, and cause them to precipitate their moisture in rain and snow, forming reservoirs, the sources of which are available for irrigation and power. The abundance of gold, silver, copper, iron, and the finest porcelain clay, has attracted a hardy and adventurous emigration, wild at first, but who have now gravitated to a sober, quiet, and orderly population, and for

Resources of Colorado: by Capt. R. H. Leese.

which Colorado stands pre-eminent. But it is eminently as a pastoral and agricultural region it will work out its great destinies. Its rich and productive valleys and arable lands, with a climate unsurpassed in the whole world; its rich grasses, winter and summer, render it the greatest stock-growing country known. This territory (soon to become a State) is nearly square in form, about 300 miles from north to south, 400 miles from east to west, with an area of 110,000 square miles, or as large as Portugal, Denmark, Greece, Switzerland, Holland, and Belgium together. Colorado has the highest mean elevation in North America. We find here the connection of the basins of the great rivers—the Colorada carrying its waters through the Gulf of California into the Pacific, the Rio Grande emptying itself into the Gulf of Mexico;—the greatest tributaries of the mighty Missouri and Mississippi, the Platte, Kansas, and Arkansas rivers. Colorado may be justly called the Switzerland of North America, on an enormously magnified scale, but not like the European, poor in mineral resources and fully explored, but a Switzerland richer than Saxony or Bohemia, California, and Australia combined, awaiting only the advent of that industry which is sure some day to come, to put every other region of the world in the shade.

Mineral Products.

MINERAL PRODUCTS.—We will allude, first, to its great mineral products. Gilpin County is noted as being the first in which gold was discovered, and it has held its pre-eminence as being the richest, although the smallest, in the State, having furnished nearly two-thirds of the gold product of Colorado, and covers the choicest section of the great mineral belt. It lies on the eastern slope of the mountains, at an elevation of 8000 feet above the sea

CENTRAL CITY.

Central City.

Central City, n w joined to the towns of Black Hawk and Nevada, making a continuous line of settlement three miles long, with a gradual ascent of 1000 feet, is the chief town of the county, and is surrounded on all sides by rich mineral veins. It is the grand centre for gold and silver, where hundreds of miners are digging day and night, sending forth ores pronounced at the Paris Exposition "unrivalled" and "unequalled." It has now a population bordering on 10,000, with fine brick blocks of houses, equal to eastern towns; two weekly and two daily papers; foundries, machine-shops, Templar, Masonic, and Odd Fellows' societies; miners' and mechanics' institutes; hotels, fine churches, elegant private residences, schools, theatres, with all the surroundings of a well regulated city; and quartz-mills, reduction-works, and mining machinery in all directions. The

Miners' and Mechanics' Institute, as a depository and centre of mining, mechanical, literary, and scientific research, has more than realized the expectations of its founders. As a cabinet for the exhibition and preservation of all that is valuable, interesting, and wonderful in the varied productions and resources of the sierras and parks of our country, mineral, geological, and fossil, it is fast increasing in importance and variety. Colorado, admitted to be the richest mineral country in the world—nowhere else can be found and collected, so readily preserved, and exhibited so successfully, her richest stores and treasures. The institute has a well-selected library, and on their files are found the best current periodicals and magazines from all parts of the world. During the year 1867 the three banks of Central City have shipped from thence $1,200,000 of gold, the six leading companies crushed 20,000 tons of rock, which yielded $803,000 gold, leaving 6000 tons of tailings, worth $20 and $30 the ton, and a few hundred tons of choice ores, first-class, saved for smelting. These companies run on an average 170 stamps, and the result averages about half a ton to a stamp. At this time there are running, in Gilpin county, sixty-three mills, containing 1210 stamps, 26 other mills, and 181 engines, having an aggregate of 4500 horse power. The cost of mining at the present day is high, owing to the high price of labour, which is twice as high as it should be, and necessarily will, as emigration falls in, decrease. The cost of living is very moderate, in proportion, and abundant and excellent. There is no finer or better beef in the world than the prairie-fed wild buffalo, and venison and native grouse abound. For fuel the parks are one vast coal-field, conterminous with iron and copper.

Resources of Colorado: by Capt. R. H. Leese.

CLIMATE.—The mineral resources of Colorado being conceded, and established beyond all cavil or doubt by actual experience, I will endeavour to give some reliable formula as to its great advantages in agricultural and stock-raising occupations. As climate has everything to do with the successful carrying on of these pursuits, I will give the careful observations resulting from a residence in the territory since its occupation. It is different from that of the surrounding territories. By its great elevation it is cooler, and the mountains, attracting the clouds, cause an average amount of rain, exceeding largely Kansas and other neighbouring States; while the melting of snow in the dry summer season keeps those tributaries to the large rivers having their origin in this territory better supplied with water than in other States. In this respect Colorado possesses advantages over other localities, where, during a certain period of the year, most small rivers entirely dry up. The mountain formation is such as to shelter the whole extent of country from the prevailing north-west

Climate.

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winds, which come laden with the vapours of the Pacific Ocean, and here is a most striking evidence of the beautiful harmony of Nature. The summer heat of the southern tropics tempers the winter climate of this region, which otherwise, from latitude and elevation, would be Russian in severity, and enables the plough to be in operation in February on the sides and valleys of the Rocky Mountains, 6000 feet above the level of the sea. The average rain-fall in the southern States is 50 inches per year; in the eastern, 40; Minnesota, Northern California, 30; Nevada, Nebraska, Utah, 20; Kansas and Western Arizona, 15; Western New Mexico, 10; South-eastern California, 5—estimated in round numbers, and shows that Colorada compares favourably, if it does not excel, as an agricultural country. The constant clearness of the sky during the months of July and August makes rain at that time scarce, but crops are well supplied by irrigation.

Farming and its Results.

FARMING AND ITS RESULTS.—Farming, at the present time, is limited to a few hundred thousand acres, but there are numberless small valleys among the mountains, from 50 to 100 acres each, that would pay handsomely, all of which possess an inexhaustible soil, from 10 to 12 feet deep, created by the constant washings from the sides of the mountains, since mountains there existed. The results of a small farm of 60 acres, last year, under the rudest cultivation, gave 70 bushels of barley per acre, 200 bushels of fine sizeable potatoes per acre, with oats, yielding upwards of 80 bushels, while a field of turnips averaged 15lbs. weight each. These statements seem wonderful—almost ridiculous and fabulous—but they are facts; and I can assert, from eyes that saw it, that a cabbage in Central City, last October, weighed down 64 lbs., and a turnip 19¼ lbs.

Fruits and Vegetables.

FRUITS AND VEGETABLES.—Fruit has not been cultivated yet, but the hill-sides are covered with raspberry and strawberry plants; wild currants, grapes, and gooseberries grow in large quantities, and a very excellent and palatable wine is made from the grape. The snow falls occasionally from November to May; seldom over 6 inches in depth, and has rarely remained long enough to make sleighing. In no other country are there so many bright days in the year. Disease is little known—epidemic, never; and such is the extreme purity of the air that meat at all periods of the year will keep for any reasonable time by simply being hung up exposed to its clear current, such is its dryness and absence of dew. Farming, of course, is only carried on in the valleys of streams, and table lands which can be reached by water ditches. Everything that can be raised in the middle States has been most successfully grown here—such as Indian corn, wheat, rye, barley, oats, buckwheat, and

beans, while every description of vegetables grow to perfection, and to an enormous size. Onions, cabbages, and turnips are unequalled in the world, and sorghum is successfully cultivated: 50 bushels of wheat and 100 of Indian corn to the acre is not uncommon. Resources of Colorado: by Capt. R. H. Leese.

PRODUCTS TO 1867.—In 1867, as nearly as can be computed, Southern Colorado alone, with a sparse population, produced 675,000 bushels of Indian corn, 350,000 bushels of wheat, and raised 35,500 head of cattle, 86,000 sheep, and 3,000 hogs. To show the eagerness of the people to acquire lands in the midst of "that mythical country, still styled on the maps the Great American Desert," 900 persons in 1867 gave notice of their prescriptive rights in lands not yet surveyed, while 42,000 acres have been entered on land warrants, and over 12,000 paid for in cash. These lands are taken for actual residences by men who in another year will be reckoned among our thrifty farmers. It will be seen, then, that Colorado can not only supply her children with the precious metals, but she can feed them on plenty, and in great abundance. Products to 1867.

And thus, a few years hence, our mines developed through their vast extent to a value beyond estimate, our plains covered with herds of cattle, with flocks of sheep, our fields waving with abundant grain, our orchards and vineyards abounding, we may challenge the world for a more gratifying picture of happiness, while our population, then counted by millions, deeply imbued with the love of free government, and resolved to maintain it, will confess and proclaim loudly to the whole world that "There are few places where it will be pleasanter to live, and *harder to die in*, where society is better organised, where honest industry is better rewarded, or where fortune is ever so near at hand."

The ease, the comfort, the rapidity of travelling with which this vast, and hitherto unknown, country can to-day be reached, I will hope to point out in a future letter.

STOCK-RAISING.—It is beyond a doubt that, laying aside its unsurpassed gold and silver mines, and coal beds of unlimited extent, the chief item of the wealth of Colorado will be hereafter found to be in its grazing lands—"Every spear of grass is worth its weight in precious metal." I say, without hesitation or fear of contradiction, that this country, where for centuries have lived and fattened countless millions of the wild buffalo, is destined, and must be, the greatest stock-growing country in the world; and we will defy the world to Stock-raising.

Resources of Colorado: by Capt. R. H. Leese.

compete with or surpass us. The Farmers' Club of New York State have decided that the cost of raising a calf to the age of two years is $50; the Wisconsin farmer puts it in his State at $15; while one of our most intelligent farmers, close to Denver City, whose accuracy cannot be doubted, has proved the cost of raising the calf to three years old to be but $7. Cattle roam out all the year upon the plains, with the cost of herding only. Immense herds of cattle and sheep abound at this moment, and but one report comes up from all engaged in the business of raising them, and that is full of the most cheering results. In sheep-farming the wools exported yield large profit, while the flocks increase in a ratio truly wonderful.

Example of Profitable Investment.

It may be interesting to give a short statement of what the result has been with a small investment of $6000. The investor purchased 300 two-year-old heifers, and a proportionate number of bulls for breeding purposes. In giving the increase in five years of this small herd, the result will astonish the uninitiated, but they are facts. At the end of the first year he counted 250 calves; at the second, 225 more; at the third, 220 more; from original herd at the end of the fourth year 225, and 168 from the first year's calves; the fifth year, 225 from the old, and 225 from the second year's product. This gave at the end of the fifth year—750 cows, at $35 each, $26,250; 225 two-year-old, at $20 each, $4,500; 418 two-year-old and yearlings, at $15 each, $6,270; 561 calves, at $10 each, $5,610: cash valuation, $42,630. The expenditure for the first year was one Mexican herder, at $30 per month wages, and $20 rations; for the second and third years, three herders, at $150 per month; the fourth and fifth years, five, at $250 per month, making a total of $10,200. No disease of any nature interfered with the profits of the five years' experiment, and herein Colorado has the most immense advantage over the only State that can at all compete with it—Texas, where annually a fatal distemper decimates its herds, and which among the Colorado herds is entirely unknown, from the great elevation of the grazing prairies and extreme purity of atmosphere. But let any gloomy observer put down a heavy percentage for losses (which, however, as yet have never happened), and then I think he must confess that raising stock in Colorado is rather a profitable business, and an indolent way of making a fortune. The raising of stock will bear the most thorough scrutiny, and for anyone seeking a sure paying investment, I say buy cattle, hand them over to the "ranchmen," who, knowing the immense profits of the business, will take charge of the herd, and pay all expenses themselves for one-half increase of stock, so that it requires little or no personal attention of the investor.

In Chicago, last year, were sold 35,000 head of Texan cattle, at prices varying from $5 to $3 per hundredweight. They can be raised in Colorado at less, and, freighted at much less cost, reach market in much better condition, and command higher prices. Throughout the whole territory, on the mountains, plains, and hill-sides, among the parks and small valleys, is a large extent of country especially adapted to sheep-raising. English stock-raisers and sheep-breeders will find here a far better opening, and much nearer home (within a fortnight's travel) than in Australia. The wool interest of our country is yet small to what it will be when this mountain region is occupied. Our importation of the foreign fleece, which now reaches to about $30,000,000 annually, will entirely cease, and we can keep that much of our gold at home. Resources of Colorado: by Capt. R. H. Leese.

Here, then, we have it clearly demonstrated that, with unlimited power, through never-failing streams, we have a fine field for the manufacture of our cloths, our blankets, and woollen garments, and that we can clothe as well as feed and fill the pockets of our citizens from our own teeming earth, with golden and silver "*rocks*" to purchase with.

THE GREAT AMERICAN DESERT.

In looking over our great country, with her boundless wealth and natural advantages, her past, present, and future growth, we cannot fail to be impressed with the importance of the vast extent of country lying west of the Missouri River. Until within a very few years this whole region was unknown. Early travellers and explorers led people to believe there were no lands suitable for cultivation from the Platte Valley to the Humboldt River, in Nevada. The first settlers in the "Pike's Peak" country were surprised they were not buried 10 or 12 feet under the snow the first winter; and still more surprised the next summer to find healthy heads of wheat, the seeds of which had been accidentally dropped in a garden at Denver. It is here the early map-makers located the great American Desert. This popular error still exists, and it is painful to suggest to the thick-skulled gentry—who in the Eastern States still project maps on cheap paper, with lamp-black and pokeberry juice, for the edification of the rising generation—that they must get up another geography, and locate another bald spot upon their charts for that place of fabled desolation; for if they had them out there they might knock out what little brains they have with a Colorado onion, bury them in one of our squashes, give them head-stones from beets, and slab them over with The Great American Desert.

Resources of Colorado: by Capt. R. H. Leese.

slices of one turnip, the product of the desert of their imagination. In 1844, William Gilpin (now Governor of the territory), then just returning from explorations in the Rocky Mountains, declared that this region was of the greatest value for pastural and agricultural purposes, and that its mines would astonish the world; but he was pronounced insane, because he attacked that map with the big spot on it, marked "The Great American Desert." His description of the grasses in the plains, the character of the soil in the valleys, and notes on the formation and geology of the mountains, carried conviction to any being possessed of reason, and the faculty of applying it, from knowledge of other lands. And yet he who predicted that we should be here to-day—our plains smiling with cultivation, our hills covered with flocks and herds, our mines yielding their countless quantities of richest gold and silver ores, and the mountains echoing the blasts of our stupendous Union Pacific Railroad engines—was pronounced mad. Sir, madmen such as Franklin, Stephenson, Watt, Fulton, and old Gilpin, have made your and our country.

Mineral Resources.

MINERAL RESOURCES.—But to return to our mineral advantages, I would offer a succinct statement of their location. The several counties of the territory contain at this time a population exceeding 100,000, which a year before the war was unsettled. Gold being the primary cause of the emigration, we will commence with Gilpin County, where it was first discovered.

GILPIN COUNTY

Gilpin County.

Is situated nearly in the centre of the territory, North Clear Creek running through it, and has the richest gold mines of the country within it. Good pine timber is abundant, but in the vicinity of the mines large quantities have been consumed for fuel, lumbering, and timbering. It is well watered by the South Boulder and North Clear Creeks, with their tributaries, furnishing a large amount of power available for mining purposes. A "consolidated ditch" has been constructed at a great expense, taking its water from the head of Fall River, and winds ten miles along the sides of the mountains into the section where most of the developed mines are situated. It is proposed to cover over this ditch to make it frost-proof, and thus furnish 150 mills with a water-power each equal to 40 horses, and by laying a track on the covered ditch it can be used as a railway for the transportation of timber to the mines. Three cities have within five years grown up in this county—

Nevada, Central, and Black Hawk—which at this date have become one, and extend in continuous line for three miles, having 10,000 inhabitants. The rock in this county is almost exclusively granite, gneiss, and mica slate, and geologically belongs to the "Azoic Age." The metalliferous veins belong to one system, having a strike of north-east and south-west, with a slight dip to north-west; and since their formation the rock has been subject to so little subterranean disturbance that they are nearly vertical, and not discolated by faults. The greater number are fissure veins, with good walls, and can be traced on the surface for long distances, and will be found deep and permanent. Hitherto there has been no openings to a greater depth than 500 ft., and the ore has invariably been found to be richer at that depth. Resources of Colorado: by Capt. R. H. Leese.

The gold is generally found associated with iron, copper, lead, zinc, silver, and in some veins with antimony, arsenic, and manganese. From 10 to 50 feet from the surface the ores are oxydised—below this they all contain sulphur. The gold on the surface can nearly all be extracted by amalgamation in the stamp-mill. The sulphuret ores yield only from 40 to 50 per cent. On these ores the application of high heat in a short time produces the same changes that nature effects in ages at a low temperature. The ore being in quartz or felspar, can be concentrated with great facility; and after it is crushed and amalgamated the cost ought and need not exceed 75 cents per ton; while the whole cost of crushing, amalgamating, concentrating, with interest of money invested, wear and tear, and superintendence, need not be more than $5 per ton. The five principal lodes in this county aggregate 20,000 ft. of shafts; levels, inclines, and tunnels as much more. We are paying now from $6 to $8 a cord for wood and mine timber, but when the railroad connections are opened, which will be in a very few months, these prices will diminish largely, and wood as fuel give way to coal. As to climate, in this, as with all other portions of the territory at such an elevation, it is the finest in the world; indeed, it is said that to "start a graveyard" a rope had to be used, "and the oldest citizen hung."

CLEAR CREEK COUNTY,

In Colorado, is situated south of Gilpin in a horse-shoe shaped basin, formed by a curve in the main range of mountains. This county is well supplied with fine timber on the ridges, with the intervening slopes and hill sides covered with a rich and abundant grass for stock; very little of the land is suitable for farming. South Clear Creek, and its affluents Clear Creek County.

Resources of Colorado: by Capt. R. H. Leese.

—Chicago Creek, Fall River, Mill Creek, South Fork, Quail Creek, and Bard Creek, furnish more than a thousand fine water-powers. The bars on these streams have been mined since the first settlement of the country, and although worked on to a considerable extent, still yield from $3 to $10 a day to the man, and sometimes more under favourable circumstances. Quartz-mining is to be now the leading industry, and seems to offer better inducements and advantages than in almost any other county, chiefly on account of the facility of tunnelling, and great water-power near at hand for reduction works. There are four towns at present, of which the county seat is "Idaho," situated on Clear Creek, at the mouth of Virginia Canon, down which a fine road, six miles, leads to Central City. Another excellent road, thirty-five miles, leads to Denver, and another, up the stream, to Georgetown. Idaho is noted for its mines and mineral springs, and its magnificent scenery. Many people are attracted here in the summer by the two latter. The town is small, but has one of the best hotels on the mountains, with good stores, shops, mills, &c. Fall River is three miles above —has hotels, stores, &c.

GEORGETOWN,

Georgetown.

Famous for its very rich silver mines, is thirteen miles from Idaho, and the creation of the past two years. It has fine houses, stores, banks, churches, schools, hotels, and all the surroundings of a mining town, and when the erection of reduction works for silver ores is complete will be one of the most prosperous towns in the State. It has a beautiful location, and has now a population of 3000 people. The silver-bearing veins are very numerous, and many of them of large size, carrying a good percentage of ore, and being found in the abrupt and precipitous sides of the mountains, offer great facilities for opening and tunnelling, thus obviating the necessity of expensive machinery for pumping and hoisting. With mines thus worked, one or two miners can open a vein and extract the ore, with no other capital than their own labour. With veins existing of large size, and with such facilities for extracting the ore, the amount that will be taken out for some years to come will be limited only by the facilities and capacity of the reduction works. The richness of these ores has been tested and proved by working in a large way. They are of three kinds—first, those that contain 20 per cent. of lead; these must be smelted, and as they nearly all contain zinc, copper, antimony, and bismuth, combined with the lead and silver, they are more suitable for reduction in a cupola than in a reverberatory furnace. Nearly all the fluxes required to melt these ores are found in the ores themselves. The second-class is the same as the first,

Corner of F and Holliday Streets Denver

except that it contains less lead—not more than from 1 to 10 per cent.; this ore can be reduced most profitably by washing in a reverberatory furnace, with salt to change the sulphuret of silver into a chloride, and subsequently extracting the silver by amalgamation. This process is in operation on the Reese River, in Nevada, where the millmen guarantee 80 per cent. of the assayed value to the owners of the ores. The last variety of the ore contains silver glance, or pure sulphuret of silver, without any admixture of other metals but iron. This can be reduced by crushing wet under the stamps, and amalgamating, without roasting in pans—the cheapest and most rapid way of reduction. This variety is not so abundant as the other two. The large stream of Clear Creek passing rapidly through these mines, with a great descent, affords almost unlimited power. Fire-clay of a fair quality for the manufacture of fire-brick is found on many points of this stream. Resources of Colorado: by Capt. R. H. Leese.

ARAPAHOE COUNTY

Has a western front of 30 miles, and extends eastward to Kansas. It lies almost wholly on the plains, and is watered by the Platte River and its numerous branches. The surface is undulating, divided into rolling ridges by the numerous streams intersecting, and no point rising to any great elevation. Timber is confined to the Platte bottoms, which produce cotton-wood trees of immense size. There are extensive pineries within 40 miles. The soil of the valley is rich, and yields without irrigation. The upland is a rich gravelly loam, and when irrigated yields more largely than the bottoms, and is covered with rich buffalo or gramma grass, on which stock thrive and fatten the entire year. Small grain and vegetables grow abundantly, and in some cases produce enormous crops. A canal has been completed to Denver, at a cost of $100,000, to supply water from the Platte River for irrigation and manufacturing purposes. Several thousand acres of rich upland will thus be brought into cultivation. Coal is found in various places, but not developed to any great extent, and is costing now at Denver $10 a ton Arapahoe County.

DENVER

In this county, is the commercial and political capital of Colorado. Here is located the United States Mint, Land Office, Surveyor-General, the Governor, the United States Collector, Assessor, and Assayer. The city has fine churches, school-houses, seminaries, hotels, theatres, three daily and four weekly newspapers, a fine driving park, Denver.

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grounds of the Agricultural Society, and all the surroundings and attractions of the metropolis of a thriving western State. Strangers gaze with astonishment at seeing such a town so far west of the Mississippi, in the heart of the "Great American Desert," requiring but one more step in civilisation to make it perfect, and which a company has been incorporated to take, and will be accomplished in a few months—gas and water in the streets and houses. Denver is the finest city of its size west of Chicago, and no finer locality could have been selected for an inland town upon the continent. It is situated on the east side of the Platte River, 12 miles from the base of the mountains, on a gently-sloping plain facing the river, giving a commanding view of the mountain range to the westward from every house and street. The business houses are fine substantial brick structures, which would be a credit to towns of the Atlantic States. The streets are very wide and regularly laid out, and from the nature of the coarse gravelly soil require no paving, but make the finest, smoothest drives in the world. Many of the private residences are beautiful, with an attractive and home-like appearance. The population now exceeds 10,000. A stranger visiting Denver is received with the utmost cordiality. The people are generous, open-hearted, and whole-souled. Hospitality is one of the peculiarities of their nature, and is considered a duty to the poor benighted heathen from abroad, who arrives expecting to meet people dressed in skins, a revolver in each hand, and a bowie knife between their teeth. In the summer, the thermometer ranges about 80°; the nights are delicious, cool, and dewless. The winters, as a rule, are mild, with occasional light falls of snow, and a brief period of severe cold, which soon disappears; and literally there is no disease peculiar to the climate. The view from Denver, looking westward, takes in about 200 miles of the mountains, including Long's and Pike's Peak, and is admitted by all travellers to be unequalled in the world. Always new, always changing, and presenting a different aspect and effect with every change of light and shade as the clouds float by, it has the power to attract to its contemplation, and leaves impressions on the minds of the beholder never to be forgotten. To give some idea of the prosperous state of the business of this young City of the West, the statistics collated from a report of the Committee of the Board of Trade, derived principally from returns from the office of the United States Assessor, exceeded in 1867 $100,000,000.

Water-power on the Platte River, opposite Denver, is estimated at 1,843,500lbs., equivalent, with a fall of 113 feet, to 6312 horse power. Apply the volume of water to mechanical purposes, and Denver will rival the great manufacturing cities of the East;

conduct a portion into the streets and houses, and it will become the most beautiful city on the continent, as it is now the most healthy. Resources of Colorado: by Capt. R. H. Leese.

RAILWAYS.—The railroad as yet has not reached to Denver, but branches from both Pacific roads will reach there as soon as they can be built. The northern branch to Cheyenne, about 100 miles, will be built on the route, and approved by the chief engineer of the Union Pacific. That company have contracted to furnish the iron and rolling stock as fast as the road bed is ready. It is now nearly so, and there is no doubt the road will be opened simultaneously with its gigantic parent, the U. P., on July 4, 1869. This road will accommodate the whole mining region, and make an outlet for the supply of coal through the country the U.P. road runs, and which has now to be shipped from Iowa. The U. P. R. Eastern Division, connecting with the St. Louis, is now about 200 miles distant, but gradually growing less. Most excellent six-horse coaches now run from Denver to both roads, and through the mining districts. Other roads, radiating from Denver to all the cities in the gold and silver regions, west and south, are projected, and will be built as fast as possible, and thus make Denver the great entrepôt and commercial centre of the surrounding country. Railways.

COLORADO: ITS RAPID SETTLEMENT AND GREAT PROSPERITY.

Here, in a region where so few years since solitude and desolation reigned, and all was desert, the busy sounds of cheerful life fill the vales, and what was wild and rugged has become a garden. The flood of busy emigration has flowed into the regions of the Rocky Mountains, and is manifesting itself in the development of their various resources. Plains arid are proving the fountains of an inexhaustible wealth, enthusiasm which prompted the first adventurers is not damped by the fading of delusive dreams, but still gives energy to the hand of industry, and the plough is now turning the soil in valleys which have been secluded and remained unfrequented since the world began. Colorado: its Rapid Settlement and Great Prosperity.

Six years have but passed away since the pioneer with axe, and hunter with his traps, were alone possessors of this country, and now in one year alone, that just passed, the business done in Denver exceeded in sales of merchandise $6,000,000: $2,000,000 were paid for freightage, 13,000,000lbs. of wheat and corn were sold, $1,000,000 worth of lumber, $10,000,000 paid by passengers on stage lines and for express matter, 250 new buildings

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erected, $2,300,000 gold shipped by banks, United States Mint and others, besides Eastern Exchange, sold by banks, amounting to $8,500,000, and the amount of cash paid over bank counters being the large sum of $78,000,000; and only the other day Denver was a log hut, in which General Denver lived, and dreamed of what she has now become, and here we leave her, and travel on to—

Coal.

COAL.—The immense beds of coal existing throughout the territory of Colorado are well worthy of attention in examining the capabilities and resources of this new land. Situated, as they are, so far from any other workable coal-fields, and surrounded by a vast extent of country comparatively destitute of fuel, it shows the bountiful provision of the hand of Providence in placing these things where most needed, to assist in the development of the country. The lignite formation extends across the first range of the Rocky Mountains, on the Laramie Plains, extending westward nearly to Great Salt Lake, occupying an area, estimated by Dr. Hayden, the United States geologist, of 5,000 square miles, in beds of from 5 to 11 feet thick. The Union Pacific Railroad passes directly through them, and they are now brought into market.

Proper Emigrants.

PROPER EMIGRANTS.—Now, let me ask, Who are the right people to go out West and colonise this virgin territory? I would answer—The producing class—the farmer, the stock-raiser, the wool-grower, the dairyman, the miner, and labourer. There is the natural wealth, and these are the class to utilise it. Those going soon find out that the climate, resources, and advantages more than repay the privations attendent on a first settlement in a new country. Those who wish to grow up with it, have a location pleasant to live in, good society, and comforts of an eastern life, can find it now in the towns of Colorado. Doctors are not in demand; the climate is too healthy, from its elevation and distance from large bodies of water. Many who have left the East despairing and hopeless have recovered, and now rejoice in renewed health, restored energies and prospects. School teachers are highly paid, and good ones are always in demand, as the rising generation are increasing very rapidly. Servant girls were getting in the spring of 1868 from $10 to $12 a week. These prices should, and will be, reduced somewhat, but just now, whether it is owing to the "dryness of the atmosphere," the "lightness of the air," and other causes, they are hard to keep, and get into the notion of house-keeping, so vacancies are frequent, and hard to fill. One thousand could now obtain either good situations or husbands. Mining labour is always in great demand at better prices than in any other mining country so easily reached.

People who expect to get rich in a month will probably be disappointed. If getting rich were so easy, there are plenty of men sharp enough out there to take advantage of it. Whoever goes to Colorado, thinking this can be done without labour—hard labour—had better get the idea out of his head, or stay at home. Fast young men, who are only useful in carrying a gold-headed cane, will not find it a paying business. Neither do rogues or the light-fingered thrive. They soon become afflicted with a throat disease, caused by too close contact with a rope, provided by a vigilant arrangement. For honest labour there is constant demand, and for those who have no capital but muscle there is no better place. Thousands in our eastern States, and millions in Europe, would be glad to have a home in the Far West, if they only knew they would have no bad luck. Of course, all cannot succeed in everything; some failures will occur, but those who are struggling for a living, with families to feed, should seek the West somewhere, anywhere out of the crowded cities. There is plenty, and room for all. The poorest may become a peer if the stuff is in him; and as a boy once wrote to his father in the East—"Some very small men are elected to office here; you had better come on." But to those who are doing well at home, I say stay there; but if out of business, desperate, and bound to go somewhere or commit suicide; do not do the latter, but steer west. Give your spirit vent; a live man West is worth a dozen dead ones East.

Resources of Colorado: by Capt. R. H. Leese.

PRICES OF LABOUR.—The prices of labour in the spring of 1868 were—Sinking engine-shaft, per fathom, from £36 to £45; drifting, per fathom, £12 to £18; sinking winzes, per fathom, £22 to £27; miners' wages, 12s. per day; pumpmen, £1 per day; pitmen, 15s.; lumbermen, 12s.; bucket-fillers and labourers, 9s.; tutworkmen, 12s.; enginemen, 12s.; carpenters, 15s.; ore-dressers, 18s.; mechanics, from $5 to $7 per day; farm hands, $30 per month, and found; hotel cooks from $50 to $75; waiters, $30. Expense of living at hotels, board and lodging, $10 per week; boarding-houses, $7 to $8 per week; backing, $4 to $5. Dry goods and clothing are very little above the price of the eastern. Ponies and saddle-horses, from $40 to $100; cows, from $30. Rents are very reasonable—a good sized dwelling-house costs from $15 to $30 per month, according to convenience and location. Flour sells at $8 per cwt.; potatoes, $1 50c. per bushel; beef 10 to 20c. per lb; butter, 60c., all currency, the dollar being equal to 3s. English.

Prices of Labour.

PICTURESQUE BEAUTIES OF COLORADO.—There is also another class of persons who should go West—those whose lot in life is such as to be able to while away a large portion of

Picturesque Beauties of Colorado.

Resources of Colorado: by Capt. R. H. Leese.

their time in travel and amusement. Let these happy ones—or rather lucky ones—turn away from contemplating the handywork of art and science in the East, to the glorious pictures fashioned for them by the almighty hand of Nature's God in the Far West. Those, then, who would enjoy a summer trip should ignore the old beaten path of summer resort, with its heat, dust, flies, and fashion. Let them visit the Rocky Mountains when the country is to be seen in all its beauties, the snow gone but off the peaks, and when Nature's panorama and storehouse of curiosities are exhibited, in dazzling splendour and bewildering magnificence. They can drink mineral waters from Nature's pure fountains; have baths, hot or cold, from the same sources; strawberries and ice cream, from real ice, off the same hill side; with pleasant hotels and halting-places on their road; and hunting, fishing, and trapping abounding in every direction; and, again, the luxury of quiet contemplation while gazing on the stupendous and sublime of Nature's rarest beauties. Go where you will the prospect is charming; but all is dwarfed by the indescribable grandeur of the mountains. Volumes have been written on the Alps, but the world has only one such view as is presented from the valley prairie east of Denver. In bewildering sublimity "none but itself can be its parallel." There may be isolated views of the Alps as beautiful as any 20 miles of the Rocky Range, and the icy land of Alasaka has its "St. Elias," that towers higher than the highest of them; but from this valley is presented, in one grand view, 200 miles of the Rocky Mountains, until the range is lost in the distance. At times black, threatening clouds hang upon them, adding to the beauty of the scene; while the storm seems spell-bound and held captive, having no deliverance until these clouds are burst and discharged; with the fierce lightning flashing incessantly and harmlessly in its violence. The setting sun, casting evening rays through the passing clouds, and fringing them with its matchless tints; here and there flinging a silver lining around the enraged elements, and breaking out in refulgent splendour on the distant peaks, flashing in almost dazzling brilliancy upon the eternal snows. He whose good fortune it has been to witness this sublime and awful scene of material and moral grandeur must confess that the hand of the Eternal Architect alone could have fashioned out in such perfectedness this wonderful panorama.

The Great Snowy Range is the first to meet the eye, and the observer insensibly wanders along its vast ridged and broken sweep, until it is lost in deep blue vaulted domes on either side. It has no two points alike, and confuses the very conceptions of men in gazing on this colossal masterpiece of the Almighty Architect. Yonder is a mass of peaks, as if made up of inverted icicles; and beside them, it would seem, stupendous snow drifts, with their

unique and countless forms, had fallen in. Here is a hillock of spotless white, whose garments change not with the varying and revolving seasons—regular, graceful, rounding with mathematical precision, until it finishes with its tapered cap of snow. There are deep ravines, vast gorges, rude scraggy peaks, and precipices so steep that the eye cannot pierce to their foundations, as if the earthquake had taken the Western World up in its Titanic arms, and frenziedly tossed its mightiest rocks in wild disorder broadcast across the plains.

Thus north and south, and for 200 miles towards the setting sun, extend these vast snow-clad mountains, as far as eye can see and mind conceive—monuments of Omnipotent power, presenting their varied beauties and surpassing grandeur, and the observer turns away only when the last ray of the setting sun, receding, and parting with their topmost crowns and the mellow light, takes up the graceful task of displaying, through night's coming shadows, this mute but most impressive tribute an all-wise God has reared unto himself. Further on, at the very head of the great rivers, the Platte, Arkansas, and Colorado, where these mighty streams begin their journey in the eternal snows of the dividing range, flowing, ever flowing on into opposite oceans,—here erects his gigantic crest, overshadowing the picturesque little village of Montgomery, as the Pyramids overshadow the tents of the Arabs,—here stands Mount Lincoln, the mighty monument of the Almighty, dedicated to our martyred President. Few have been privileged to behold so magnificent a prospect as is seen from its summit. Colorado is spread out at your feet. The South Park, sixty miles long and thirty miles wide, with its undulating hills, green meadows, and a thousand glittering lakes and brooks, dwindles to a pleasure-garden. You look over Long's Peak, north, almost into Dakota. You look over the plains of Utah into the west, stretching towards the golden shores of the Pacific. You look over the Spanish Parks, south, into New Mexico; then, turning to the east, the eye wanders backward, over Pike's Peak, where the great plains seem to rise up like an emerald ocean. And such is Colorado's Monument to our dead, but immortal, President, with its base clothed with evergreens, sublime wreaths of *immortelles*, such as never hung on the tombstones of emperors, with its capitol reaching so near the heavens as to attain the spotless purity of eternal white—bright emblem of immortality. Let other States and other people raise their monuments of patriotism fashioned by art to gild the fame of the great dead, Colorado points in all time to her proud, monumental mountain. Here, to daunt the traveller, are no swamps; no chills or fevers; no poor-houses or paupers; no drenching rains or deep snows; no mud, but plenty of rocks;

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no old maids, and few young ones; plenty of young America and enterprise; no circuses, but the best collection of natural curiosities in the world; no millionaires, but plenty of material to manufacture them out of the raw article; no Bois de Boulogne, or De Cambre, or Hyde Park, but a dozen large ones, where they could be hid away out of sight; no cheese factories, but plenty of milk, and room for them; no woollen factories as yet, but plenty of wool; no world's fair, but the ores that took the first gold premium at the Paris Exposition; no cholera; no yellow or typhoid fever, or other pestilence; and, altogether, not the best or the worst country to live in. If it were the best, everybody would want to live there, and that would make the population too thick. If, with its advantages of climate, and natural wealth, Colorado had occupied the position of Ohio it would have been to-day the first in importance in the Union. It was not to be, and the best portion of our continent was placed far inland, to induce the settlement of that distant country, and open the way for the Pacific Railroad. The hardest part of it is accomplished. Her Alpine summits have been passed and mastered, and the tide of civilisation rolls rapidly on from east to west to people the great unknown wilderness, and where a heaven-high wall of ice and snow-crowned rocks seem to mark a natural boundary and division between two peoples. Silver gates have opened, and the two races will meet in chambers of gold, and in the mountain-hedged alley commingle and spread like a vast inland sea over all the land, while these elevated regions, once considered worthless, will eventually become the seat of empire, as they are the rocky crown of the Continent. Thus the future throne of Columbia shall be of native gold, and the silver sceptre God has given her she shall wield sitting above the clouds.

MODE OF REACHING COLORADO—UNION PACIFIC RAILROAD.

Mode of Reaching Colorado—Union Pacific Railroad.

BEFORE concluding these papers, the writing of which has been a pleasing and grateful task to me, I would like to give a short sketch of the present easy way of travelling towards a land I have described as being so promising; so that, in the event of anyone being tempted to put my descriptions to personal examination and test, they may read how cheaply, pleasantly and quickly, without fatigue, they may do so.

The general interest that is taken in the great national undertaking of building the Union Pacific Railroad steadily increases as the road approaches completion, opening up and developing, as it does, vast regions of territory hitherto unknown, whilst the ability and economy which have characterised its construction have won the admiration of both America

and Europe. The magnitude of the work, the lack of information, the difficulties of running a line through a country of such a mineral formation that the compass was often deflected as much as 23°, of transporting material, the doubts expressed by the most experienced railroad builders as to the feasibility of the enterprise, would have damped the ardour of men less endowed with genius, energy, and means; but its projectors have fully proved their ability and earnestness by overcoming every difficulty, and the iron bands of civilisation are now stretching out 1,000 miles westward from the Missouri River, and leaving but 300 miles more to be accomplished to the junction with the line coming towards it from San Francisco. The summit of the Rocky Mountains has been passed at a point known as "Sherman," and at a height of 8,262 feet above the level of the sea, and 7,292 feet above Omaha. From Cheyenne, where the great ascent of the road commences, the rise is seventy feet to the mile. The superiority of the road is the marvel of everyone who has travelled over it, and no road in America is so well or more thoroughly equipped, everything being new. Every improvement has been adopted. Sleeping "Palace Cars," fitted up with every luxury, and divided into private little state rooms, making a comfortable spring double bed at night and private saloon by day, with dressing and toilet arrangements at each end, with water-closets, well ventilated and well warmed. On January 1, 1868, 90 locomotives were in use, and 107 contracted for. The passenger landing from one of the magnificent ocean steamships in New York in ten days, proceeds by the Hudson River Railroad, due west to Chicago, 930 miles in 32 hours; by the Chicago and North-Western to Omaha, in 20 hours; from Omaha to Cheyenne, by the Union Pacific in 40 hours. From Cheyenne to Denver the railroad will be opened in six months from this time. Now the distance of 120 miles is run over by six-horse stage-coaches in 20 hours. Thus the time from London to the heart of the gold and silver region of Colorado is actually within fifteen days of running time. I have received letters on the 16th day in London from Central City.

The expense of travelling, including the stoppage at New York, incidentals and living on the railroad, with the extra $5 per night for the sleeping car accommodation, will be within £40.

Omaha, which is the eastern terminus of the Union Pacific, is now waking up to her importance, which has steadily kept pace with this gigantic undertaking. Three years ago with a population of 3,000, her inhabitants have increased to 20,000. Its climate is peculiarly healthful, and its facilities, from its location on the banks of the Missouri, of

Resources of Colorado: by Capt. R. H. Leese.

communication with the East by rail and South by steamboat, makes it the commercial centre and business metropolis of the North-West. Here can be found merchants who count their sales by millions, fine banks, churches of all denominations, private residences unsurpassed anywhere in size and architectural beauty.

Settlements along the line of this road have been built up with a rapidity of growth that surprises everyone. Every station is surrounded by a little village; while such towns as Fremont, Columbus, Grand Island, North Platte, Julesburg, and Cheyenne have quadrupled their population within this present year; Cheyenne, for example, which one year ago contained not more than half-a-dozen houses, now boasts of a population of 5,000 with three daily and four weekly newspapers.

COMMERCIAL WEALTH OF COLORADO, U.S.

From the "Mining Journal," February 13th, 1869.

Commercial Wealth of Colorado: by Capt. R. H. Leese.

I AM continuing to receive such evidences from the territory of Colorado of the extraordinary successes during the past year, in the raising of stock and growth of wool, that I have thought it would be interesting to many of your readers my writing to you on this subject. It appears that the disease which so cruelly attacked the herds in England and Europe two years ago, has, in a somewhat more modified and less fatal form, destroyed during the last summer and fall, great numbers of cattle on the plains of Texas, Florida, and the Illinois prairies, while Colorado has escaped unharmed. I would recall attention to the position of the several grazing grounds in these States. In the former six months of the year, the climate is more than tropical, and almost for three months torrid, with sudden and rapid changes in the fall of the year, from the intense heat to piercing north-west winds, much rain and cold. The cattle, always roaming and exposed to the weather, with no shelter of trees, it can be readily imagined, succumbed in large numbers to such prejudicial influences; the air made more malarious by the large bodies of stagnant water in Texas and the Floridas, the lands lying barely, if anything, above the level of the sea; while on the

Colorado range, situated from 5,000 to 6,000 ft. above the level, with not one drop of stagnant water in the valleys, which are well watered with the clear, pure, running rivers of the Platte, the Colorado, Rio Grande, and a thousand of their tributaries, well wooded with the pine, and bearing the richest crops of grass in the known world, there exists not one malign influence to operate against the industry of the Colorado ranchman and farmer; so that a wonderful impetus has lately been given to the stock-raising of that State, and many of the more southern men are flocking in with their sheep and herds.

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The railroad, also, now so near completion (and which will be running throughout the region by Jan. 1, 1870), gives an enormous advantage to the Colorado citizen; so that I do most confidently believe, for young and enterprising men of small capital, honest energy, and industry, there is not such another opening on earth for sure and safe investment; while the only one adverse circumstance which could operate injuriously to such occupation has been at last removed by the United States Government, and that is the suppression of the Indian, and confining him within his reserve.

In the mining reports from the State everything is most encouraging. The silver yield shows a steady and uniform increase, and it is now well conceded and proved beyond doubt that the veins are the continuation of the Mexican lodes, and caused by the same upheaval.

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MINES AND MINING

IN COLORADO.

MINING AND MINING PROCESSES IN COLORADO: By BAYARD TAYLOR.

CENTRAL CITY, COLORADO, *June 26th*, 1866.

Bayard Taylor on "Mining and Mining Processes in Colorado."

ALTHOUGH I have come to Colorado to look at scenery rather than at gold and silver mines, it is impossible to remain in the centre of mining operations without feeling a desire to learn something concerning their character and prospects. Indeed it is quite necessary to acquire some general knowledge of the peculiarities of the ores and the technical terms describing them, in order both to understand three-fourths of the conversation one hears, and to avoid the enthusiastic explanations which would be immediately proffered if one should confess entire ignorance. One would soon "cap out," or "peter out," socially, if he did not yield so much to this community.

The region hereabout first drew miners, and afterward capitalists, from the rich discoveries made by Gregory, in the spring of 1859, and from its greater proximity to Denver. It is but one of a long chain of gold-bearing districts, many of which are still but half explored. Many more, no doubt, are yet undiscovered.

In the first place, gold is found here under very different conditions from those of California. "Free gold," as it is called (native or virgin gold), is much less abundant. Owing to the conformation of the mountains, there is but a limited space for "gulch" or surface washing, and the rush of miners to the country in 1859 and '60 soon exhausted the best of these. The "blossom-rock" (partially disintegrated quartz, with the gold mostly in a "free" state) gradually followed, leaving the great storehouse of the mountains still untouched, but containing the gold in such stubborn and difficult combinations, that by the old processes, from 50 to 80 per cent was lost, or, as they say here, "went down the creek." Then came discouragement, despondency, failure of experiments, and a general collapse, the results of which are everywhere apparent. Yet new lodes were all the time being discovered, and each succeeding assay showed the richness of the mineral.

As a general rule the gold is found in combination with copper, and the silver with lead. The silver ore, in fact, is simply a very rich argentiferous galena. Some mineralogists say

Bayard Taylor on "Mining and Mining Processes in Colorado."

that the ores are copper and lead, in reality, holding the nobler metals in combination. It is immaterial which name we give, provided the latter can be completely extracted by some cheap method. This is now the problem which is vexing Colorado—which suspends enterprise, and holds back emigration for a time. Out of the many processes proposed, two only have been put in operation—Keith's and Lyon's. Monnier's and Kenyon's have not yet been actively tested. A few of the old stamp mills are still running, and those companies which can afford to mine their ores a considerable time in advance of crushing them, will still make a profit by this method. The yield of gold is said to be fully doubled, by allowing the ore to be exposed to the air for the space of a year. Probably two thirds of the companies, however, are waiting the result of experiments.

One thing is certain; the mines of Colorado are among the richest in the world. I doubt whether either California or Nevada contains a greater amount of the precious metals than this section of the Rocky Mountains. These peaks, packed as they are with deep, rich veins—seamed and striped with the out-cropping of their hidden and reluctantly granted wealth—are not yet half explored. They are part of a grand deposit of treasure which will eventually be found to extend from Guanajuato and Real del Monte to the Mackenzie and Coppermine rivers, and which, if properly worked, will yield a hundred millions a year for a thousand years! Colorado alone ought to furnish the amount of the national debt within the next century. *The gold is here*, and the silver, the copper, and lead—possibly, platina (there are already rumours of it)—and all that is needed is invention, intelligence, and properly organised enterprise.

MINING AND MINING STATISTICS.

From "Description of the Parks of Colorado," June, 1868.

Mining and Mining Statistics, from "Description of the Parks of Colorado," June, 1868.

THE ores of Colorado are acknowledged by the best authorities to be the richest auriferous ores yet discovered in the United States. The value of gold per ton, by assay of the Colorado ores, as taken from the mines, greatly exceeds £20. In fact, out of some two hundred mills now at work in Colorado, it would almost be a matter of impossibility to

find a single mill reducing ore that showed by assay so low a value as even £30 per ton, besides which those ores contain from (seldom less than) 10 per cent., and frequently as high as 28 per cent. of copper to the ton of crude ore.

The Colorado ores are of the character termed "Rebellious," containing sulphurets, arsenic, antimony, &c., &c., the presence of any one of which materially destroys the action of the quicksilver used for the collection of gold (which is of infinite fineness). So injurious is the effect of the presence of any of the above minerals upon the action of the quicksilver, that it is seldom that more than 15 per cent. of the gold contained in the ore is collected by this, the present mode of reduction now practised in Colorado. The balance of the gold, together with all the copper, is lost, by passing off with the powdered ore termed "tailings." Yet, notwithstanding this small percentage of yield, the reduction of these ores proves remunerative.

As the greater part of the expense incurred in the production of bullion from these ores is chargeable to the mining and reduction of the ores (the mere amalgamation or collection of the precious metals being but a small proportion of the total expense), it is evident that nearly all the precious metals saved in excess of the above small percentage is clear gain. And this most desirable end has at last been attained by Mr. Pengilly, who, after 18 years' experience at his works in Cornwall, combined with great perseverance and scientific knowledge of the treatment of rebellious ores, has succeeded in subduing these ores, and making them so tractable that he saves not only 95 per cent. of the precious metals, but all the copper contained in the ore in its natural state; and this is accomplished at a less cost than the mode heretofore in use in Colorado.

PENGILLY'S PROCESS.

There are at present about 150 quartz mills in Gilpin County, Colorado, which produce annually, by the present imperfect system of reduction, about £2,000,000 value of precious metals; and the product of other mills and gulch mines in the territory swells this amount to a total of about £3,000,000 annually, whilst the value of the gold actually contained in the ores reduced is estimated at not less than £20,000,000, showing by the present mode of reduction an annual loss of £17,000,000, which might all be saved by treating the ores by Mr. Pengilly's process.

THE GOLD MINES OF COLORADO: By SAMUEL BOWLES.

Extracted from "Across the Continent," by Samuel Bowles, Editor of the "Springfield (Mass.) Republican."

Gold Mines of Colorado, from Bowles's "Across the Continent."

As to the mountains, as a natural spectacle they are first cousins to the Alps. When the Pacific Railroad is done, our Switzerland will be at our very doors. All my many and various wanderings in the European Switzerland, three summers ago, spread before my eye no panorama of mountain beauty surpassing, nay none equalling, that which burst upon my sight at sunrise upon the Plains, when fifty miles away from Denver; and which rises up before me now as I sit writing by the window in this city. From far south to far north, stretching around in huge semicircle, rise the everlasting hills, one upon another, one after another, tortuous, presenting every variety of form and surface, every shade of cover and colour, up and on until we reach the broad snow-covered range that marks the highest summits, and tells where Atlantic and Pacific meet and divide for their long journey to their far distant shores. To the north rises the king of the range, Long's Peak, whose top is 14,600 feet high; to the south, giving source to the Arkansas and Colorado, looms up its brother, Pike's Peak, to the height of 13,400 feet. These are the salient features of the belt before us; but the intervening and succeeding summits are scarcely less commanding, and not much lower in height. Right up from Denver stands the mountain top that was the scene of Bierstadt's "Storm in the Rocky Mountains," and up and down these mountain sides were taken many of the studies that he is reproducing on canvas with such delight to his friends and fame for himself. No town that I know of in all the world has such a panorama of perpetual beauty spread before it as Denver has in this best and broadest belt of the Rocky Mountains, that rises up from the valley in which it is built, and winds away to the right and to the left as far as the eye can see—fields and woods and rocks and snow, mounting and melting away to the sky in a line often indistinguishable, and sending back the rays of the sun in colours and shapes that paint and pencil never reproduced, that poetry never described. These are sights that the eye never tires of—these are visions that clear the heart of earthly sorrow, and lead the soul up to its best and highest sources.

Forty or fifty miles below Denver, near what is called the South Park, a beautiful table-land of meadow and wood, between Pike's Peak and the main range, is the second

centre of mineral development in Colorado territory; but this one upon Clear Creek is, as yet, the scene of largest improvement and population. Other sections of the territory are probably as rich in valuable ore—*some are well believed to be much more so;* no part of the mountains may be held wholly barren; it happens only that these localities were most attainable, and were first lit upon by the early comers. What is called gulch mining, or washing the sand and soft and pulverized rock of the valley, for the gold that ages of rains have filtered out of the solid rock of the mountains, is about over in Colorado—we see only now its abundant ruins in sluices, piles of worked-over earth, and the rotting simple machinery sometimes used; yet in some of the fresher gulches this work is still profitable, and we saw pan washings that turned out one, two, and three dollars to the pan. I have a dollar's worth of gold dust that I saw washed out from about three quarts of earth in less than ten minutes of time.

Gold Mines of Colorado, from Bowles's "Across the Continent."

The chief attention now is given to the solid mining; but for various causes, principally from the high prices of labour and provisions, all mining here has been dull for nearly a year. Not more than twenty or twenty-five of the one hundred stamp mills in the territory are now at work. With labour and food from three to four times as high as at the east—growing mainly out of the interruption to communication by the Indians, and the inflation of the currency last year, and the short supply of labourers because of the war—and with gold now reduced to nearly par, mining hardly pays expenses. When expenses get back, as they are soon likely to do, to the currency standard, the business will again become profitable, and be actively resumed. Preparations are fast making for this now, and mills and mines are being set in order, and resuming work. Another reason of the dull times is that much of the best property has been changing hands—passing from the early or original owners and workers into joint-stock companies, owned mainly in the east, which in some cases are not conducting the business so wisely as their predecessors, and in others are stopping for a better labour and supply market, or to enlarge and improve their works. Again, it is believed the mining interest is on the eve of great improvements in the processe of extracting the gold from its associate metals and sulphides, and owners of mines and mills are experimenting in this direction, or are content to wait for the results of others' experiments.

The common process of crushing the ore into fine powder, and then washing the same upon copper plates coated with quicksilver, which collects the disintegrated gold, or is

Gold Mines of Colorado, from Bowles's "Across the Continent."

supposed to, it is well ascertained gets but about 25 per cent. of all the precious metal. Three-quarters goes off in the "tailings," or refuse, as it is called. With such a waste only the most valuable of the ore pays expenses at such times as these. Good ore yields about $100 in gold per cord, or $12 per ton, under the stamping and quicksilver process.

This leaves a fair margin under favourable management, for getting out the ore costs about $40 a cord, hauling $5, and crushing and extracting $20. Choice ores yield $300 a cord, but these are rare. The difficulty is not in separating the gold from the pure copper, iron, or lead, or the quartz with which it is compacted; but the sulphurets of these metals, which suffuse and coat the whole, are the plague and mystery. These cover and hold the gold in a stern chemical lock, how to break which in a simple, effective way is the great study of the mineral chemists and mining capitalists. Various processes are on trial: one which we saw applies a hot flame and a brisk wind to all the pulverized ore, which changes its chemical character, burns up the sulphurets, and leaves the metals all free; then they are scoured, so as to brighten the gold, and then washed, as originally, in copper pans coated with quicksilver, which, better than any other article in these days of paper currency and forgotten coin, knows the gold when it sees it, and sticks to it with fraternal embrace. This process was getting $25 a ton from the "tailings," or refuse, of the old or common process, or twice as much as was originally obtained. Another process has obtained $375 from less than a ton of "tailings," which is probably many times what the original ore produced by the common stamping and washing. The object desired is to "desulphurize' the ore: both these inventions do this, though in different ways. When the thing is done, and this season can hardly pass until it is satisfactorily accomplished, we shall see the Colorado mines yielding from $500 to $800 per cord of ore, instead of from $50 to $250 as now. (A cord is rated at about eight tons, though different ores vary very much in weight.) This rate of production will at once put a new phase upon the business, afford almost any price for labour and supplies, redeem all the mining companies from whatever present embarrassments they feel, stimulate the investment of capital in these mines with great rapidity, and even, by generous dividends, go far to excuse that vicious system of putting up a mining company's stock to one, two, three, and five millions, when the actual cash investment was not over as many hundreds of thousands.

The gross production of the Colorado gold mines is not correctly known. The United States mint reports only ten millions in all up to July first of last year. This puts the

territory next to California in total product, ranking her above North Carolina or Georgia in all their history; but it gives her only a small proportion of the whole production of the nation from the beginning till now—ten millions out of six hundred millions, California being accredited with all but about forty millions of the gross amount. Other authorities give Colorado's total production as over fifty millions, accrediting her with twenty millions in a single year (1864), but these figures are certainly as far the other way. An intelligent authority here (General Pierce, the surveyor-general of the territory,) gives me the following estimates:—1862, ten millions; 1863, eight millions; 1864, five millions. The falling off indicates nothing as to the real wealth of the mines—only changes in the business of producing, and the natural results of high prices. The year 1862 embraced successful gulch mining, and the first of the quartz mining, under most favourable circumstances, following a year (1861) of depression and non-production; far more fruitful of croakers than 1864 and the first half of 1865 have been. Just now the new territories of Idaho and Montana, in the far north, are drawing off the floating population, the gulch miners, and those eager for fortunes at a jump. The day of these is over here. Slow and sure is now the motto for Colorado, as for California. Her capacity is proven—admitted; capital, science, labour, and machinery will return twenty-five, fifty, and one hundred per cent. on their investments; but gold eagles are no longer picked up by the basketful, and hundred-thousand-dollar fortunes in a day or a month are not to be had here, but further on, if at all.

Gold Mines of Colorado, from Bowles's "Across the Continent."

All reports, all facts, whether floating in the air from mouth to mouth, or ground out by hard experience, and put down in black and white, go to sustain the broadest and fullest meaning of the dying statement of President Lincoln, that *the United States hold the treasury of the world;* and establish beyond reasonable doubt, that the countries of and adjacent to the Rocky Mountains are freighted with the most precious of ores—gold first, next silver (in which Nevada and Utah are most conspicuous, and Colorado not found wanting), and then copper, with which the Colorado mineral veins are richly loaded; and also lead, iron, and coal. On the Plains, near the foot of the mountains, coal and iron are already found in abundant quantities, and are being mined and put to practical use. Found, too, just where they are most needed, to take the place of the wood, now fast being drained from the mountains, and furnish the material for the machinery necessary to work over the ore and make available the finer metals. Irrigation, already entered upon on a large scale, even here, will supply agriculture with its lacking; and through and by all these means

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combining, and worked with the energy and enterprise of the American people, stimulated by the great profits sure to be realized from wise and persevering use of the opportunities, the western half of the American nation will fast move forward in civilization and population; this wilderness will blossom as the rose, and the east and west will stand alike equal and together, knowing no jealousy, and only rivalling each other in their zeal for knowledge, liberty, and civilization.

EXTRACTS FROM O. J. HOLLISTER'S "MINES OF COLORADO."

Mines of Colorado. (Hollister.)

GEOLOGY.—The *Granitic* formation, which is the oldest, formed by the cooling of the orginal fiery fluid composing the globe, may be seen on and beyond the Snowy Range of the Rocky Mountains in various parts of Colorado; more abundantly on the western side of the range than the eastern. In masses of true granite, syenite, or porphyry, it makes its appearance on McClellan Mountain, in the Argentine silver district, where it is seen to have been thrust through younger formations to the prominent position that it occupies; on the west side of the Boulder Pass, where massive granitic ranges from the buttresses of the snowy sierra as we descend to the Middle Park; and on the western side of the park, where it forms the grand mountain wall that encloses it.

Of *Metamorphic* rocks, gneiss is by far the most abundant, and most of the gold-bearing veins are found in gneissoid rocks, though they are generally termed "granite" by the miners. Fine exposures may be seen near Black Hawk, the lines of stratification marking the mountain side, as stripes do the body of a zebra.

Resting upon the granite in the middle Park, on the banks of Grand River, are exposures of conglomerate, probably of *Silurian* age, overlaid by sandstones and limestones, probably of *Devonian* age, and above this the coal measures of the *Carboniferous* formation, the only place in the territory where true carboniferous coal is known to exist—*i. e.*, coal that will coke.

Near the Sangre de Cristo Pass, the granite is overlaid by slates and limestones, probably of *Silurian* age, the limestones containing crinoidal fragments, but too small for the identification of the species. Farther north, the Three Tetons are composed of conglomerates, formed of pebbles, boulders and large masses of gneiss, granite, mica-schist, and hornblende-schist, with gneissoid rocks, slate, and limestone on their flanks. Mines of Colorado. (Hollister.)

Rocks of the *Permean* age have been discovered on the plains in the eastern part of Colorado, consisting principally of limestones, some of which abound with the characteristic fossils of this period.

The *Cretaceous* formation is well represented, especially along the base of the mountains on the eastern side. The shells of the inoceramus are found in a limestone at Boulder City, baculites of large size in great abundance on the Platte, a few miles from Denver, while the limestones lying between Colorado City and Pueblo contain the inoceramus, scaphites, baculites, ammonites, and other characteristic cretaceous fossils. These beds extend for a considerable distance to the eastward, and in wearing down under the action of atmospheric agencies masses have been left in conical hills, looking like gigantic ant-hills; on these, fossils can be picked up in great abundance. Between Pueblo and the Sangre de Cristo Pass, the teeth, spines, and bones of fishes, principally of the genera Ptychodus and Lamna, so common in the cretaceous beds of England, are found in remarkable profusion. The neighbourhood of Zan Hicklin's ranch on the Greenhorn River is the richest locality for fossils of this description that we ever saw.

In Eastern Colorado, coal measures are found of *Cretaceous* age, the shale and limestones accompanying them containing the characteristic forms of this period.

The *Cretaceous* formation is also well represented in the Middle Park by baculite beds and sandstone abounding with the scales of fishes.

The *Tertiary* formation has a remarkable development in Colorado. Its thickness as exposed on the western side of the Rocky Mountains, from the Parahlamoosh Range, which is composed of tertiary lavas, to the junction of White and Green Rivers, is 10,000 feet, Included in this are coal measures containing many thin veins of coal, beds of gypsum. thin beds of limestone, and above these, petroleum shales at least a thousand feet in

Mines of Colorado. (Hollister.)

thickness, abounding in fossil leaves and insects, the shales containing them occurring at points 60 miles apart; above them brown sandstones and conglomerates, having a thickness of from 1200 to 1500 feet, and containing silicified wood, turtles, and bones and teeth of large mammals.

The country in which these are found is a most remarkable one. From the summit of a high ridge on the east a tract of country containing five or six hundred square miles is distinctly visible. Over the whole surface is rock, bare rock, cut into ravines, cañons, gorges, and valleys, leaving in magnificent relief terrace upon terrace, pyramid beyond pyramid, rising to mountain heights: amphitheatres that would hold a million spectators—walls, pillars, towers, castles everywhere. It looks like some ruined city of the gods—blasted, bare, desolate, but grand- "beyond a mortal's telling." Originally an elevated country, composed of a number of soft beds of sandstone of varying thickness and softness, underlaid by immense beds of shale, it has been worn down and cut out by rills, creeks, and streams, leaving this strange, weird country to be the wonder of all generations.

In this region is found a deposit of petroleum coal, scarcely to be distinguished in any way from the Albertine of New Brunswick. In lustre, fracture, and smell, it appears to be identical, and would yield as much oil as this famous oil-producing coal. It is in a perpendicular vein three feet wide, and was traced from the bottom of Fossil Cañon, near Curtis Grove, White River, to the summit level of the country, a thousand feet in height, and for nearly five miles in length, diminishing in width towards the ends of the vein. Its description and analysis is thus given by Dr. Hayes, of Boston:—

"Black, with high lustre like Albertine, which it resembles physically; specific gravity "1·055 to 1·075. Electric on friction; breaks easily, and contains ·33 of one per cent. "moisture. It affords 39·67 per cent. of soluble bitumen when treated with coal naphtha, 'and after combustion of all its parts 1·20 per cent. of ash remains; 100 parts distilled "afforded bituminous matter 77·67; carbon or coke 20·80; ash left 1·20; moisture ·33; "total, 100·00. It expands to five or six times its volume, and leaves a porous cake, which "burns easily."

The vein is in an enormous bed of sandstone, No. 2, and its walls are smooth. Beneath the sandstone are the petroleum shales No. 3, one bed of which, varying from ten

to twenty feet in thickness, resembles cannelite, and would, it is thought, yield from fifty to sixty gallons of oil to the ton. This bed was traced for twenty-five miles in one direction, and was seen at points sixty miles apart in another, and it no doubt extends over the entire distance. If so, in that single bed are twenty million million barrels of oil, or a thousand times as much as America has produced since petroleum was discovered in Pennsylvania. There are few beds of coal that can compare with this in the amount of bituminous matter which it contains, or in the great value that it possesses as an article of fuel. The tertiary beds of Colorado are as rich in fuel and gas-making material as any coal region with which we are acquainted, though it is more than probable that the petroleum now in the shales and petroleum coals came originally from the oil-bearing coral beds of some much older formations. Mines of Colorado. (Hollister.)

On the eastern or Atlantic side of the mountains are tertiary coal measures, containing beds of coal and beds of iron ore of good quality.

At Golden City one bed has been exposed, which, owing to upheaval, stands nearly vertical, and has a thickness of from ten to twelve feet. About twenty miles north of Denver, on Coal Creek, there are several exposures of thinner beds, but still workable. This tertiary coal is destined to play a very important part in the future history of Colorado. The available wood in the mining regions exhausted, as it soon must be, to these subterranean supplies all parties must come at last. Houses, furnaces, locomotives must depend upon it, and before many years pass its consumption will rise to a million tons annually. These tertiary coal beds probably extend to the northern boundary of the territory, which is by no means their limit in that direction.

Above them are beds of sandstone and conglomerate, abounding in fossil palms, firs, and various resinous and gum-bearing trees, together with modern exogens. Perfect trunks of large size are sometimes found lying on the plains, where they have been left when the rock that held them was disintegrated. Between Denver and Golden City many fine specimens may be found; still more on a low range of sand hills about twenty miles south of Denver, and still finer specimens are brought from the South Park. In the Middle Park, west of the Grand River, is also a coarse sandstone passing into conglomerate, and containing silicified wood. Above it are beds of trap, and, where this has disintegrated, chalcedonies and agates are found—principally moss agates, as they are called, but which are really

Mines of Colorado. (Hollister.)

chalcedonies containing oxide of manganese in a dendritic form. The rock originally holding them was a lava poured out of some long extinct volcano; this was full of vesicles or hollow places, produced by gas or vapour, and in process of time these were filled with extremely fine particles of silica, separated from the surrounding rock, forming the ordinary chalcedonies. In some cases a small quantity of oxide of manganese has been carried in with the silica, and this crystallizing in an arborescent or tree-like form has produced the appearance of moss in the chalcedony, and thus have been formed the beautiful moss agates which strew the plains of the Middle Park.

The lava beds of the Plains, as seen near Golden City, Boulder City, and other localities, seem to be the most recent tertiary deposit of Colorado, and bear witness to the terrible volcanic eruptions that, at no very distant period, geologically speaking, devastated the country. The hot soda springs at Idaho, where the water has a heat of about 94°, the hot sulphur springs of Middle Park, ranging from 92° to 114°, and the boiling spring of the San Luis Park, still bear witness to this stormy time.

The *Drift* period is represented by immense accumulations of boulders and gravel in the valleys of almost every mountain stream, though ice did not produce as much effect during that period as the height of the mountains and their latitude would naturally lead us to expect.

Of the Plains in general it may be said that they are characterized by great horizontal expansion and aridity of climate. We shall not linger longer on their eastern and central portions than to note that railways are fast superseding the Tartaric caravans of the past in their trade and travel, and the fact that they may one day be thickly peopled under the revivifying influence of water procured from artesian wells. A considerable change in their distinguishing features is apparent as the mountains are approached. Where that great barrier rises abruptly from their bosom, as a continent from the waste of ocean, it sends out headlands and exhibits reefs and islands which diversify the surface contour, and produce a marked change in the climate, soil, and vegetation. This section has an elevation of 5000 to 7000 feet, but is sheltered from the far-sweeping winds of the Plains outside. It catches a share of the mists and rains that moisten the mountain slope, and receives into its thirsty expanse the more copious tribute of melted snow from the range. It occupies a break in the progress of commercial transportation such as favours the growth of large cities.

This is what we have termed "The Valley." It embraces three-sevenths of the territory, in round numbers thirty million acres, of which about one-sixth can be irrigated, that is to say, cropped. The rest is available as pasturage. Its climate is not very dissimilar to that of the same latitude in the Eastern States, except that it is much drier. The mean temperature of Denver and St. Louis is about the same, but at Denver it is higher at noon and lower in the morning and evening than at St. Louis, the average difference of the extremes for the month of January, 1863, being 25.1° at the former, and only 8.7° at the latter. The barometrical and thermometrical changes of the two places nearly correspond, only they occur from one to two days sooner at Denver than at St. Louis, just as they do at St. Louis one to two days sooner than on the Atlantic coast. The scanty meteorological statistics of Denver indicate, also, that the fluctuations of the mean atmospheric pressure and mean temperature are less at the base of the mountains than at St. Louis, giving a calmer atmospheric ocean, fewer and less severe storms, which conclusion is sustained by experience. The average annual fall of rain and snow, counting ten inches of snow as one of rain, in the valley, is twenty inches. Tender plants in the high mountains are not injured by a degree of cold which freezes still water half an inch thick. The air is so clear and pure that the range of vision is almost infinite. There are points in Colorado where a well-defined mountain horizon, more than one hundred miles distant, may be seen by the naked eye. There are all but three hundred and sixty-five days of sunshine in the year. Clouds are the exception, storms rare, and fogs never known. Such an atmosphere must be especially tonic. People live and work 10,000 feet above the sea. The rainy season of the mountains—May, June, and July—favours the valley with an occasional shower, but outside of that, rain seldom falls. Frost may be expected to the end of spring and by the 15th of September, giving a season as long as that of New England and New York.

In the warmer months, under the noon-day sun, the air of the valley often becomes oppressively hot, but toward evening it rises and gives place to cooler currents from the range. Here is the place for those toilers of the brain whose nervous systems are shattered, and who are dying for want of sleep. Even a remorseful conscience fails to banish sleep in this climate, a fact which is commended to the notice of moral and religious teachers. About the middle of October snows begin to fall, and to the first of January a snow that will last two days may be expected every two weeks. In January the fall of snow is more plentiful, it lies on longer, and is accompanied by severer cold, while February is

Mines of Colorado (Hollister.)

usually pleasant, and is improved by the farmers ploughing for spring crops. Thence to the rainy season, the snows are heavier than in January, but more transient than in November and December, and melting quickly, or rather being absorbed by the porous soil, and as quickly renewed, they start or prepare the ground for the new crop. A snow storm is always succeeded by a cold night, and that invariably by a bright warm day. The mercury has been known to mark 32° below zero at one o'clock in the morning, and 68° above within twelve hours. It will sink to 10° below five or six times in a winter. Absence of moisture prevents these cold spells from nipping the flesh. Men team it all over this region the year round, always camping out, and seldom suffering inconvenience. This would be impossible if the indications of the thermometer are to be taken as they are in the east.

The soil of the Valley rests on calcareous rock, but the wash from the granite mountains above negatives the special inference that might be drawn from that. On the borders of the numerous streams it is sand, ashes, and decomposed vegetable matter. On the plateaus between it is sand and gravel, stiffened by a more or less friable clay. Properly supplied with moisture, lowland or upland, it exhibits a strength rarely equalled by any other soil.

It has been observed by historians that rainless countries—those in which man can control seedtime and harvest—are most conducive to the rapid increase of the race. Such are Egypt, Mexico, and Peru, the three singular and solitary birthplaces of civilisation. Artificial watering by means of main canals or *acequias*, and a net-work of smaller ones reaching and fertilizing every acre of the whole face of a country, is called *irrigation*. The valley is one broad smooth plateau, tipped up just enough by the mountains to give water a gentle flow over it. It is cut by numerous streams with great fall and carrying abundance of water. Taken from the mouths of the cañons on a grade of four feet per mile, the chief canals soon achieve the highest ground between the streams, and are thus carried for long distances, supplying all the land below them. Their construction is mostly accomplished with the plough and scraper, each adjoining landowner contributing his quota of the expense and having a perpetual right to the water at the additional tax for repairs. In this way *acequias* thirty miles long and watering 20,000 acres have been constructed. The Surveyor-General estimates that there were 136 miles of irrigating canal made in 1866, at a cost of $1000 per mile. The main arteries in operation, each farm arranges its separate system so as to leave no spot unblessed, and so that no swift currents shall carry away more than they bring. For the small grains the ground is flooded; for corn and potatoes the water is run

between the rows; and for fruit trees it is allowed to flow constantly a few feet distant. The attention of one man is required during the operation, which lasts perhaps a month on a large farm and in an average season. All this is extra labour and expense, very true, but it has its advantages. A philosophical farmer of Colorado says of it:— Mines of Colorado. (Hollister.)

"I have kept an accurate account of the extra expense of irrigation; but when I "consider that the soil is made to yield its utmost capacity with uniformity, and that the "hands irrigating can always do extra work enough to pay expenses, I am decidedly in favour "of systematic irrigation, and never shall own a farm without facilities for irrigating a "considerable part of it. To the advantage alluded to may be added, that the soil is "constantly being enriched by the sediment of, and the salts and earths held in solution by, "the water, which is never allowed to escape from cultivated land, but is kept on till it is "absorbed. There need be no injury from the protracted drouths of sections more favoured "in general by rain."

Considering that the average crop of wheat is twice as large in Colorado as in the States, and that it brings a higher average price in a home market, we think no more need be said in palliation of irrigation. The freight tariff in favour of the Colorado farmer can hardly ever be less than a dollar on a bushel of wheat or corn.

The average crop of wheat is 25 bushels per acre,* twice that of Illinois or Ohio. Ten acres of wheat have produced 800 bushels, and of oats more than one thousand. Barley is the favourite crop, however. It makes regular and liberal returns spite of all the pests common to new countries and particular to Colorado. It is rather cold for corn on the Platte waters, but it is a sure crop, yielding 30 bushels per acre, on the waters of the Arkansas. Single fields of 2000 acres may be seen in the growing season in south-eastern Colorado. Vegetables of all kinds produce enormously, shading all other countries in that respect, California alone excepted. Five hundred bushels of potatoes have been harvested from a single acre. Cabbage heads weighing 30 lbs., and turnips half as heavy, are not unusual. A lady, recently arrived in Denver, sent her little boy to market for "a small cabbage." He returned presently with a 16-pounder, the smallest he could find in town.

At the first annual fair of the Colorado Agricultural Society—September, 1866—there were on exhibition turnips weighing fifteen pounds, which were grown in the heads of the

* Calculation of Surveyor-General John Pierce.

Mines of Colorado. (Hollister.)

gulches 1000 feet higher than Central City. There was altogether one of the finest displays of mammoth vegetables and roots, of large, ripe, plump grains, and we might add, of fast roadsters, that ever was seen.

The native fruits of Colorado are a small, worthless *thorn-apple;* a large, pleasant *plum,* trees rather shy bearers; small, black, acid *gooseberry* in abundance, not of much value; *cherry,* called "choke," really a pleasant fruit, size of large wild cherry, black, heart-shaped, free from insects, quite as good as the Morello, bushes large and prolific; *currants,* black, yellow, and red, black the best, a large, pleasant, acid fruit, superior to many cultivated varieties, bushes large, hardy, and good bearers, furnishing fruit for six weeks; *raspberry,* good size, red, juicy, fine flavour, makes a choice wine, bush twenty inches high, very prolific, and coutinues in bearing for six weeks; the *strawberry* and *whortleberry,* the former ripening in altitudes where it freezes every night of the year according to Fahrenheit, abundant in some parts of the Foot-Hills, just beginning to be cultivated, sold in 1866 at $3 a quart; the whortleberry not found much below but plenty at an elevation of 9000 feet. It is said that wild grapes grow in the southern portion of the territory, and a small variety of the common red cherry in some of the parks and cañons of the Foot Hills. Apples, peaches, grapes, and pears are raised by the Mexicans in the San Luis Park, and something in that direction has been accomplished on the Arkansas. On the Platte, seedling plums, peaches, and apples made a most thrifty growth the past season, and about $20,000 worth of pear, apple, and peach trees, raspberry and blackberry bushes, grape and strawberry vines, were set out in the fall. Fruit growing is yet in its veriest infancy. It took the settlers three years to learn that they could farm at all, and two more to discover the importance of the interest, and the territory is but eight years old. From the full success of fruit culture in Utah, in about the same altitude and latitude, there is reason to hope everything from it here.

We come at last to the most important resource of the Valley—its broad, pastoral acres, numbering 25,000,000.* Its native grasses are many and rich, the buffalo and bunch varieties being equal to oats in the sheaf. Starting with the sap-snows, they attain their growth by the end of the rainy season, and then ripen into hay, standing. On this stuff large herds have made four hundred pounds weight per head in a summer. With a fresh range for winter, they come into market in the spring better beef than the seven-months-stall-fed

* Artesian wells are turning the Desert of Sahara into a garden of fertility; so they would "The Great American Desert," in so far as there is any such thing.

stock of Iowa and Illinois. Oxen, worked till in single file they hardly cast a shadow, run on this grass a few weeks and become beef. But the best illustration of the pastoral capacity of the Plains is their own countless aboriginal cattle. They live through the winter, and through all the winters, to a most tough old age, and there are a good many of them, although few to what they were. Mines of Colorado. (Hollister.)

Well, the existence of buffalo proves the fine pastoral quality of the Plains, the best of which is the Valley of Colorado. When the buffalo of forty years ago shall have been replaced by domestic cattle, and the Indians, antelope and wolves by horses and sheep, the idea of a "great American desert" will doubtless be finally dismissed by the whole world, as it should be. Stock not only thrive in winter without feeding, they are driven to the eastern market in the spring, and constantly improve. With a route five hundred miles wide they do better to move ten miles a day than to remain in one place. The raising of stock has not become much of a business yet, because it has been cheaper to buy and make beef of the train oxen. These usually arrive out in June pretty thin, and rather than drive them back with no load, their owners sell them low. Last summer (1865) 5000 head of this stock were bought at Denver by Iowa farmers, to drive home and feed during the winter. Early frosts cut the corn in the north-west, the price doubled in a few days, and that badly frosted this speculation. Cattle bred on the Plains mature younger than elsewhere. Fall calves are not checked in their growth by the winter as in the east, and they commonly become mothers at eighteen months of age, a precocity which argues a healthy and rapid development. It is estimated by those in the business that there are one hundred thousand head of horses and cattle in the territory, and there are large flocks of sheep in the southern portion. These sheep were never shorn until 1866, and but few were then, from the lightness of the fleece, the coarseness of the wool, and the distance to market. The Mexican sheep is small and hardy, economical in its use of wool, wearing merely a little hempen stuff on its back. No pains was ever taken in breeding, and the article can barely be called a sheep, either in quality of mutton or wool, or in fecundity. The first cross of an improved breed increases the size, doubles the yield of wool, and restores prolific power, indicating that as a basis for extensive sheep-breeding, the native stock, if we may so call them, cannot be excelled. The only drawback to the business is the wolf, and he is fast disappearing. The conditions of climate and soil could not be more favourable. It is high and dry, there is little snow or severe cold, the grasses are short, sweet, and rich. Only second in its adaptability to sheep, are its advantages as a dairy

Mines of Colorado. (Hollister.)

country. Butter and cheese, unsurpassed in quality and of home production, are proportionally as cheap as in the East. The first cost of cows is high, from $60 to $100, but their keeping amounts to very little. On the whole we believe we are safe in affirming that there is no such country for stock as this.

Of the game and wild beasts native to the valley, the Indian is the most prominent, useless, pernicious, and costly to hunt. Indians and railways do not well agree, and as the country bears more of the latter it will less of the former. With an able and honest administration of their affairs in Colorado, no serious trouble need be apprehended in the future. Next to the Indian come the grizzly, cinnamon, and black bear; and after them the cougar or mountain lion, the big white, or buffalo wolf, the shaggy brown, the black, the grey or prairie wolf, and the *coyote*, wachunka-monet, or medicine-wolf of the Indians; the buffalo, noticed before; the elk, black, and white-tailed deer; the antelope and mountain sheep; lynx, wild cat, badger; four varieties of the hare; the silver-grey, the cross, the red, and the swift foxes; mink, pine marten, and beaver, and the prairie dog. The latter resembles the fox-squirrel, their flesh is tender and palatable, and their oil very superior in quality. They live together in subterranean villages, seem to have a communal system of government and things whether founded on Divine right or the consent of the governed, has not been discovered. They locate the towns without regard to the vicinity of water, sometimes in places where none is to be seen, and subject neither to rain nor dew. It is gravely doubted by some writers whether they make the same use of that fluid as other animals—the drunkard excepted. The large prairie wolf used to be a characteristic feature of the Plains, but like its fellows, the buffalo and Indian, is fast passing away.

Of game birds there are the wild turkey, mountain grouse, sage hen, prairie chicken, ducks, geese, swans, ptarmigan, &c. The sage hen is only found west of the Range, which is true also of its favourite food, the sage bush. The ptarmigan exists only in the frosty breath of the Range, being white when the snows mostly fly and turning partially brown when they melt and run off.

Of timber the principal varieties are pine, hemlock, spruce, cedar, fir, cotton-wood, box-elder, quaking-aspen. There is a little scrubby oak, and willow and alder-bushes on every brook. Nearly one-half the Territory is more or less timbered, the trees generally thin on the ground and small.

EXTRACT FROM THE "ROCKY MOUNTAIN NEWS" AS TO THE INDUCEMENTS TO EMIGRANTS OFFERED BY COLORADO.

Inducements to Emigrants.

" Colorado offers greater inducements to emigrants than any other region. Whilst it is " new enough for the adventurer, it at the same time has stability enough to guarantee " security to person and property, and its riches are sufficiently developed to justify the " investment of capital. California and Oregon are getting too old for pioneers. The " chances are too generally taken up. In Idaho and Arizona there is too little law and " order; too little security; whilst the actual value of neither country is yet sufficiently well " proven. In Colorado there is settled society, established laws, regular mail facilities, the " telegraph, and nearly all the comforts and conveniences of the older States. With these " it has the charm of newness. A day's travel will bury the enthusiast or the pleasure- " seeker in the deepest mountain and forest solitudes, where, from the surroundings, he may " reasonably imagine that he is thousands of miles from the ever-moving channels of travel, " or the busy marts of trade. Though our developed mines prove themselves the richest in " the world, there is in their very sight as promising fields, and doubtless as rich mines, as " any that have yet been opened. It is useless to travel for weary weeks and months in " search of a new El Dorado, when you can spend your time and labour with as good or " better prospects of success within three hours' walk of populous and busy cities. Colorado " wants a quarter of a million people. As promising fields are open for them as are " occupied by the forty or fifty thousand now in the territory. Thousands of mines are " waiting to be opened. Millions of acres of arable lands are to be tilled. All will pay to " the industrious."

EXTRACT FROM "THE NEW GOLD FIELDS:" BY EDWARD BLISS, ESQ. NEW YORK, 1863.

Mineral Resources of Colorado. (Bliss.)

"THE MINERAL RESOURCES OF COLORADO.—It is a generally-admitted fact that the "entire Rocky Mountain range is of Plutonic origin, and consequently abounds in rich and "valuable minerals. But exploration and careful 'prospects' have established the "superiority, in this respect, of *certain* localities, and among these the newly settled territory "of Colorado stands to-day in a most conspicuous and favourable light. Gold, silver, "copper, iron, lead, and a variety of sulphurets, carbonates, and oxides have been dis-"covered. But as the *most valuable* of these minerals is the chief attraction for the adven-"turous pioneers of our country, the business of gold hunting and gold mining has thus far "absorbed the time and labour of explorers. This will continue to stimulate the enterprise "and characterise the efforts of the settlers of Colorado, until such time as the growth and "advancement of that region shall create a demand for the development and improvement "of the rich mines of iron and other metals known to exist there.

"The Colorado gold mines differ from those of California in this particular: that in the "former the precious metals are generally found in extensive 'lodes' of quartz and pyrites, "while in the latter, placer and gulch mining are the most extensive and the most profitable. "It must not be understood by this that there are *no* placer mines in Colorado. Numerous "gulches and ravines have been extensively worked in different parts of the territory, and "in some instances the yield has been astonishingly rich and abundant. But up to the "present time the extent of the discoveries of gulch, bar or river deposits, has not seemed to "establish a claim for Colorado as a great placer mining region. That the inexperienced "may the more clearly understand the difference between 'placer' and 'lode' mining, the "following brief explanation is appended:—Where deposits of gold are found in gulches, on "bars or in river beds, mixed only with the sands and alluvial washings of the mountains or "hill sides, and requiring oaly the action of water, by sluicing or hydraulics, to separate from "the earthy admixture, the term 'placer' is applied to this kind of mining. Where gold "deposits are found mixed with quartz rock, pyrites of iron and copper, or other metals, and "occupying *veins* between walls of solid granite, they are called 'lode' mines. These latter "can only be worked profitably by the aid of capital and powerful machinery; but expe-

" rience has confirmed the belief that this kind of mining is more permanent and quite as " profitable as ' placer ' mining. The mines of Colorado are of this class, and the leading " enterprises of the population are specially directed to the improvement and development of " these *veins* or crevices. Mineral Resources of Colorado. (Bliss.)

" The astonishing richness and extent of these veins are no longer experimental. Some of " them are, of course, more productive than others, and not a few have turned out to be " comparatively worthless. But several years of experience, and a judicious application of " well-established scientific rules, have, in a measure, obviated the necessity for long- " continued fruitless effort, and the quartz miners of Colorado are beginning to learn how to " avoid expensive and protracted labour on claims which are of but little value. Within the " last year the mining regions of this territory have been visited and carefully examined by " some of the most eminent scientific men of this country, and the reports made by these " parties are most favourable. They certify to the richness of the ores, the inexhaustible " deposits, and the entire practicability of successful and profitable mining for an immense " population."

" THE GOLD PRODUCT OF COLORADO.—It is a difficult matter to give in figures " the amount of the gold product of Colorado, since the first commencement there of " mining operations, but an approximate estimate, based upon various reports, can be made, " which affords a most gratifying exhibition, and from which fair deductions for future " anticipations may be ventured. From the reports of the Philadelphia Mint we gather " the following figures, showing the increased yield of the Colorado gold regions since their " first discovery :— Gold Product of Colorado. (Bliss.)

' 1859	$4,000
1860	$600,000
1861	$1,000,000
1862	$6,000,000
1863 (estimated)	$15,000,000

" The above statement falls far short, of course, of the entire product of the " territory. Until the introduction of a paper currency among the miners, gold dust " was the only circulating medium, and remittances to the Eastern States were often made " in this material. It is fair to presume that no inconsiderable amount of gold was thus " disposed of, which failed to reach the Philadelphia Mint, accredited to the Colorado " region. In all new gold countries the miners have a passion for jewelry manufactured

Gold Product of Colorado. (Bliss.)

"from the native gold, and in this manner large amounts have been consumed, which would "escape classification in an estimate of the yearly product. Rare and valuable 'nuggets' "are also often retained by miners as 'specimens;' so that any attempt to arrive at an "exact estimate of the gold product would prove a failure.

"But the above figures certainly afford great encouragement and hope for the "future. It must be remembered that the early history of all gold regions is a history "of 'prospecting,' of great wastes of time and money in explorations, and of serious "disappointments and privations to the pioneers. The early settlers of Colorado had to "pass through all these trials, and, what was still more disastrous, they suffered bitterly "from a lack of experience or knowledge of the business of quartz mining. They were all "*apprentices* in gold mining, and, as an inevitable consequence, met with repeated disasters "and failures which have since been mastered and overcome."

Labour.

LABOUR.—In such a country there can be no limit to the profitable application of manual labour. In the thickly-populated districts of Europe, competition, in this particular, is so great that the daily wages of the working class are, necessarily, meagre and unremunerative, while there is no possible opportunity for the accumulation of any surplus means above the actual necessary amounts required for a daily subsistence. In this particular, Colorado offers extraordinary inducements to the hardy and industrious classes of the Old World to come and settle within her limits.

The exploration and settlement of the interior wilds of the United States territories, made more thorough and extensive since the discovery of gold in the mountain ranges of California, have demonstrated beyond all doubt the existence of mineral wealth in inexhaustible quantities, and the remarkable adaptability of the soil and climate of the central region to the support of a numerous population.

All the succulent varieties of plants—potatoes, cabbages, onions, squashes, &c.—attain an enormous size, retaining the tenderness, juiciness, and sweetness which almost everywhere else belong only to the smaller varieties. The wild fruits of Colorado are numerous and abundant, and can doubtless be much improved by cultivation.

The Old World, crowded and overflowing with its packed millions, needs winnowing, and nowhere can its transplanted humanity find more room, a purer climate, or a more productive soil than in the grand ranges and fertile valleys of the Rocky Mountain region

PRODUCTION AND OPERATIONS OF MINING COMPANIES IN COLORADO.

From Hollister's "Flying Trip to the Silver Mines of Colorado."

Mining Companies in Colorado. (Hollister.)

THE three banks of Central City have bought and shipped $1,200,000 worth of gold during the year ending November 1, 1867. There are 30 mills and reduction works in operation in Gilpin County. Some details in reference to the leading companies may not be out of place.

The Black Hawk Company, running eighty 800-lb. stamps, have crushed 10,000 tons of rock, 33 per cent. pyrites, from their Gregory mine, during the year, the rock producing 11,797 ounces of gold, which sold for $275,000. Of this $165,000 has gone to pay the expenses, leaving $90,000 profit. Of this sum $12,000 has been put into the Bobtail mine, which is now producing ore, but from which no returns have been received; and nearly $50,000 has been incurred on account of inadequate draining machinery. Mr. Lee estimates the cost of delays and repairs of pump at $20,000, the extra expense of mining on account of bad drainage at $27,000. In other words, with an adequate pump, and by confining operations to the Gregory mine, the profits of the year would have been almost doubled. They are now putting in a 10-inch pump. The pump shaft is 470 feet deep, the mine has a crevice the entire length (300 feet) from two to four feet wide, and is in a better shape to supply ore than ever before. It is the intention to run this through stamps as taken out, buddling and saving the tailings, of which the company have on hand some 3000 tons. The Bobtail ore is being saved for smelting. There are 50 tons on hand, considered worth $200 a ton.

The Sensenderfer Company have taken out in the last eighteen months, 6,937 ounces of gold, worth $155,000, of which amount $110,000 has been paid to the stockholders in dividends, showing the expenses to have been $45,000, less than 30 per cent. of the gross yield. They have run their own 20-stamp water mill nearly all the time, crushing about 60 tons a week, and they have had considerable rock crushed by custom mills, probably about 4000 tons in the eighteen months. They have been pumped to death as well as the B. H. Company.

Mining Companies in Colorado. (Hollister.)

The Smith and Parmelee Company have run their 25-stamp mill steadily during the last ten months, crushing about 2700 tons of rock, realising 3447 ounces of gold, worth $76,000. They had 15 tons of first-class and 15 tons of second-class ore treated at the California Reduction Works. The first lot yielded $76 a ton, the second $57. They are having another lot of 10 tons reduced there. The pump shaft is 430 feet deep, the last 30 feet below where the mine has yet been worked. Mr. Belden, the agent, considers the mine in better condition for supplying ore than ever before.

The Ophir Company have been idle two months of the last twelve, putting in an eight-inch pump. Otherwise they have run their 24-stamp mill steadily, crushing about 2500 tons and realising 2863 ounces of gold, worth $63,000. They have saved and sold to the smelters 47 tons of copper ore, 22 tons of blanket tailings assaying 12 ounces of gold per ton, and 46 tons of buddled tailings. The pump shaft is 510 feet deep, and shows a fine vein of ore. The pump is worked only half the time, there being nothing but surface water. The mine is in shape to keep the mill supplied with ore.

The Sterling Company ran their 15-stamp mill up to July, crushing about 35 tons a week, which yielded $20 a ton. Since that they have been mining, have 600 tons, worth from $100 to $200 a ton, at discovery on the Fisk, and 75 as good or better at their Bobtail mine. They intend to sell this to the smelters, and concentrating the leaner rock, sell that also.

Mr. George R. Mitchell, for the Alps and Granada Companies, working the Alps and Mackie lodes, has taken out 3566 ounces of gold, worth $78,500, with a 12-stamp mill, in the last sixteen months. In that time he has crushed about 2500 tons of rock. The mines are in good shape for this country, although the pay-vein in both shafts and drifts is somewhat pinched at present writing.

The Bobtail Company have done a great deal of work in their mine, sinking through cap, two shafts, each more than 100 feet. About three months ago they commenced running twenty stamps, which were soon increased to thirty, on second-class rock. They have crushed to date about 850 tons, realising an ounce of gold per ton, sold 52 tons of first-class ore, assaying above $100 a ton, and have about the same amount still on hand. In the mine they are opening about as much ground as they are breaking, have ore in the bottoms of two shafts, and in a level 100 feet from the bottom of a third. A portion

of their mine is drained by the confederate Bobtail pump, and they expect it all to be eventually, since that pump drains No. 11, on the Gregory. The hoisting works and arrangements generally for working the mine are complete.

The Union Company have been and are running a 20-stamp quartz mill in Chase Gulch crushing about 60 tons, and realising 80 to 100 ounces of gold a week. They have a thousand tons of rock broken in the mine, two-thirds of it pay, and 200 tons of choice ore saved up, which, if not worth $200 a ton, is not for sale at less. They are preparing to sink their main shaft and open up two or three new lifts. Their property is on the Bates Lode.

The Susquehanna Company have been mining, simply, during the year, on the German Lode. Their shaft, perfectly timbered, has reached a depth of 200 feet, and they have started a drift west to connect with an air shaft 150 feet distant. The shaft, carried down perpendicularly, is a little off the vein, but it shows well in the drift, copper pyrites, walls 4½ feet apart.

Leopold Klein, sinking a shaft on the lode, west of the Susquehanna Company's mine, is down 230 feet, drift 50 feet long, has two or three feet of copper pyrites, 150 tons first-class, and 200 of second-class ore mined. The lode is very rich in copper.

The Pewabic Company, on the Pewabic Lode, Russell Gulch, have a shaft sunk 115 feet, crevice from four to eight feet wide, 500 tons of ore mined; 62 tons, reduced at the California Reduction Works, yielded $30 in gold per ton. They have a pump in the shaft, engine for hoisting, good building, &c.

The Black Hawk, Smith and Parmelee, Sensenderfer, Ophir, Alps, and Granada Companies have together crushed, in round numbers, 22,500 tons of rock, which has produced 28,700 ounces of gold, about 1¼ ounces per ton, worth, with the premium at 40, $28·00 In the gross yield should be counted at least 6000 tons of buddled tailings, containing $20 to $30 a ton, and a small amount of choice ore, saved for smelting. The cost of mining and milling per ton we cannot get at so closely, but suspect it to range between $12 and $15. These companies have run in the aggregate 167 stamps, showing a capacity, with their weight and speed, of 135 tons each a year, not quite half a ton per day.

MINES, MINING, AND MINERS.

From Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

Mines, Mining and Miners, from Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

IT remains for me to speak of the industrial interests, growth, prosperity, and promise of Colorado. These have only been incidentally alluded to so far; but they deserve special exhibition. The change in its material affairs and prospects, since we were here three years ago, is most marked and healthy. Then, the original era of speculation, of waste, of careless and unintelligent work, and as little of it as possible, of living by wit instead of labour, of reliance upon eastern capital instead of home industry, was, if not at its height, still reigning, but with signs of decay and threatening despair. The next two years, 1866 and 1867, affairs became desperate; the population shrunk; mines were abandoned; mills stopped; eastern capital, tired of waiting for promised returns, dried up its fountains; and the secrets of the rich ores seemed unfathomable. Residents, who could not get away, were put to their trumps for a living; and economy and work were enforced upon all. Thus weeded out, thus stimulated, the population fell back on the certainties; such mining as was obviously remunerative was continued; the doubtful and losing abandoned; the old and simple dirt-washing for gold was resumed, and followed with more care; and farming rose in respectability and promise. The discovery and opening of specially rich silver mines near Georgetown kept hope and courage alive, and freshened speculation in a new quarter; but the main fact of the new era was that the people went to work, became self-reliant, and, believing that they "had a good thing" out here, undertook to prove it to the world by intelligent and economic industry.

These were the kernel years of Colorado; they proved her; they have made her. Her gold product went down, probably, to a million dollars, say, in each of the years 1866, 1867; but it began at once, under the new order of things to rise; and agriculture also at once shot up and ahead, and directly assumed, as it has in California, the place of the first interest, the great wealth. No more flour, no more corn, no more potatoes at six cents to twelve cents a pound freight, from the Missouri River; in one year Colorado became self-supporting in food; in the second an exporter, the feeder of Montana, the contractor for the Government posts and the Pacific Railroad; and now, in the third year, with food

cheaper than in "the States," she forces the Mississippi and Missouri valleys to keep their produce at home or send it east. She feeds the whole line of the Pacific Railroad this side the continental divide, and has even been sending some of her vegetables to Omaha. Her gold and silver product is up to at least two millions this year, got out at a profit of from twenty-five to fifty per cent., is now at the rate of nearly if not quite three millions, and will certainly surpass that sum in 1869. Her agricultural products must be twice as much at least, certainly four millions for 1868, and perhaps six millions; though it is difficult to make as certain estimates in this particular, and the Indians have worked great mischief with the ingathering of the crops this fall.

Mines, Mining and Miners, from Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

Central City, in the midst of the mountains on the north branch of Clear Creek, continues to be the centre of the gold-quartz mining; and business there was never more healthily prosperous than now. All its stamp mills are in operation, and more are being erected; for after wearily waiting through two or three years for more effective processes for reducing the ores, their owners have set these in operation again, simplified, perfected, and economised their working, and from about one hundred and forty mills, and seven hundred and fifty stamps, are now producing nearly $50,000 of gold a week, at a cost for both mining and milling of from two-thirds to three-quarters that sum. Another season will see, say, fifty mills and one thousand stamps at work in this valley. The most valuable ores of the neighbouring mines are not put through this process, but are sold at about $100 a ton to Professor Hill's Smelting or Swansea Works, now established here, and working the richer and sulphuretted ores with an economy and completeness that the plain stamp mills cannot do. The ores worked in the latter form the principal product of the mines, and produce under the stamps about $25 a ton, while the cost for mining and milling is about $15 dollars. If steam is used the cost goes up to $20. The Swansea and the plain stamp mill are the only "processes" now in use in this valley. Professor Hill has proved the success and profit of the former, at least for all high-class ores. He is giving from $80 to $125 a ton for such ore, and probably makes from $30 to $40 a ton on it; and his purchases amount to some $20,000 dollars a month. He is already doubling his furnaces. But the problem is to apply his process profitably to lower-class ores; to such as hold from $25 to $50 a ton, and of which there are almost literally mountains in Colorado. The free or simple gold ores of this grade can be worked well enough by stamps and amalgamation, as in Central City and California, and the cost thereof can be ultimately reduced to probably one-half of present prices; but these constitute only a

Mines, Mining and Miners, from Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

fraction of the rich ores of Colorado. Most of them hold both silver and gold, combined with sulphurets of iron, and a process which gets one leaves the other, except, of course, smelting, which at present is too expensive for any but highly-freighted ores. This is why thousands of mines are unworked to-day; why scores of mills with unperfected processes, or plain stamps, stand idle, rotting and rusting in all parts of the territory; and why deserted cabins and vacant villages lie scattered in all the valleys about,—telling their tragic tales of loss and disappointment, monuments of the enthusiasm and the credulity of miners and capitalists, who laboured and invested wildly and before their time.

Some silver mine discoveries have recently been made in the Central City region; indeed, there is silver in all the gold ores, and gold in all the silver ores of the territory, and lead and copper in most besides; but the head-quarters of the silver business is at Georgetown, ten or a dozen miles over the mountains from Central City, at the head of the south branch of Clear Creek. Around and above this now thriving and most beautifully located of the principal mining villages of Colorado; at nine thousand, ten thousand, or even to twelve and thirteen thousand feet above the sea level, almost unapproachable save in summer, and then only by pack mules or on foot, are many marvellously rich silver veins in the rocks. Hundreds of mines have been opened; but only a dozen or twenty are now being actually worked with profitable results. The rest await purchasers from their "prospectors," or capital to develop them. The ore from the leading mines ranges from $100 to $1000 a ton. Only two mills for reducing the ore are in operation; one treats the second-class ore, such as will average say $200 a ton, reducing it by crushing or stamping, then washing with salt to oxydize it, and then amalgamating with quicksilver, at a cost of from $50 to $100 a ton; and the other smelting the higher priced ores, at a cost probably of $100 to $200 a ton. The latter establishment buys outright most of the ore it reduces, and has paid all the way from $500 to $675 a ton for it. Both processes get out from seventy-five to ninety per cent. of the assay value of the ore; but they are imperfect and expensive, and much of the best ore is sent east for treatment. The Equator mine, owned by a party of railroad men from Chicago, is one of the two or three prizes here, and sends its first-class ore, worth from $900 to $1000 a ton, all the way to Newark, N. J., to be reduced. Thirty tons were packed for shipment the day I was there. The superior yield under the closer and more economical treatment at Newark more than pays for the freight, which is but $48 a ton. The Equator mine claims to have yielded one hundred thousand dollars' worth of ore this season, and brags of a million next. Only

a portion of its ore taken out is yet worked. There are, several, perhaps half-a-dozen other mines nearly as good as this.

Mines, Mining and Miners, from Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

Georgetown now has a population of about 3,000, and the best hotel in the territory. It is one of the places that every tourist should visit, partly for its silver mines, partly because the road to it up the South Clear Creek is through one of the most interesting sections of the mountains, and partly that it is the starting-point for the ascension of Gray's Peaks. The traveller can go up to the top of that mountain and back to Georgetown between breakfast and supper; and if he will not take his tour by the Snake and Blue Rivers to the Middle or South Park, he should certainly make this day's excursion from Georgetown. Central City and its neighbourhood are much less interesting to the mere pleasure traveller. That town, with its 4,000 or 5,000 inhabitants, is crowded into a narrow gulch, rather than valley, torn with floods, and dirty with the *debris* of mills and mines that spread themselves over everything.

Scattered about, in Boulder District, on the Snake, over on the Upper Arkansas, up among the gulches of the South Park hills, are a few more quartz mills, some in operation, more not; but the principal business of quartz-mining is done in the sections I have named, in Gilpin and Clear Creek counties. Mill City, Empire, and Idaho are villages in this section, with their mines and mills, doing a little something, struggling to prove their capacity, but hardly in a single case making money, partly because of the poverty of the ore, but chiefly because it is refractory, and will not yield up its possessions to any known and reasonably cheap process. Time, patience, and cheaper labour will bring good results out of many of these investments; but others will have to go to swell the great number of failures that stand confessed all over this as all over every other mining country.

There are great tunnelling schemes proposed or started in the Georgetown silver district, by which the various ore veins of a single mountain are to be cut deep down in their depths, and their wealth brought out of a single mouth in the valley, at a much cheaper rate than by digging down from the top on the vein's course and hauling up. The "Burleigh drill" from Massachusetts, that has been in use in the Hoosac tunnel, has been introduced here for this purpose; and successful mining on a grand scale will soon take this form, not only here, but in Nevada, and indeed in most of our mining States.

Mines, Mining and Miners, from Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

The other form of mining, known as gulch-mining or dirt-washing, is increasing again, and has employed full 300 men this season. Fifty to seventy-five of these are at work in the Clear Creek and Boulder valleys; but the great body of them are scattered through Park, Lake, and Summit counties, on the Snake and other tributaries of the Blue River; on the upper Plattes in South Park; and on the upper Arkansas and its side valleys. They have averaged $12 a day to a man; but the season for this kind of mining is less than half the year, in some places because of ice and snow; in most for lack of water. The year's product from gulch-mining will certainly foot up half a million dollars, probably a hundred thousand more. New gulches and fresh "bars," or deposits of sand, brought down from the hills by the streams, have been opened this year in preparation for another year's work; and it is not unreasonable to look for a million dollars from gulch-mining next year.

These figures seem small compared with the amounts reported to be got out in the years following the first gold discoveries in 1859,—in '60 to '64,—when one year's production ran up as high as six or eight millions, and for several years averaged probably four; when hundreds if not thousands of eager miners were gathered in a single gulch, and ran over its sands with a reckless waste, taking off the cream of the deposits, and then moving on to new places, and finally exhausting both their own first enthusiasm, and all the best or most obvious chances, turning away in disgust at a "played-out" territory. But the business is now resumed in a more systematic, intelligent, and economical way; labour is cheaper; miners are satisfied with more moderate returns; and there is really almost no limit to these valleys and banks, under the hills and along the rivers, whose sands and gravel hold specks of gold in sufficient quantity to pay for washing over. An intelligent investigator of the subject tells me that the whole of South Park would pay three or four dollars a day for the labour of washing it over. But I pray it may not be done while I live to come to these Mountains and the Parks, for gold-washing leaves a terrible waste in its track.

In the valley of the Blue and its tributaries more extensive works for gulch-mining exist than in any other district; there, not less than eighty-four miles of ditches to bring water to wash out the gold with have been constructed, and the amount of water they carry in the aggregate is 8,750 inches. One of these ditches is eleven miles long; two others seven miles each; another five, and so on; and they cost from $1,000 to $1,200 a mile.

Says Mr. Thomas, of the *Rocky Mountain News*, from whose careful and elaborate investigations, this summer and fall, I draw many of the facts of this letter:—"The "facilities and opportunities for gulch-mining in this county (Summit) are equal, if not "superior, to any in Colorado. Many of the gulches now worked will last for years to "come, while much ground remains yet untouched. The Blue River will pay for ten miles "or more, at the rate of $5 to $10 dollars per day to the man. Many places will pay from $3 "to $5 per day to the man, and will be worked when labour becomes lower and living "cheaper."

Mines, Mining and Miners, from Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

In the Granite district of the Upper Arkansas, quartz gold is found in simple combination, or "free," as in California, which can be mined and reduced for $8 to $10 a ton, while it yields from $15 to $100; but these are ores from near the surface, and it is yet a problem whether they will not change on getting down in the veins, as in other Colorado mines, and become "refractory," and impossible of working at a profit by any yet known process.

The Cimerone Mines, just over the southern border of New Mexico, have attracted much attention for the last two years. Several quartz mills are in operation there, but the main yield, so far, is from the gulches, and the total product this year is about a quarter of a million dollars. San Luis Park, too, is believed to be rich in mineral deposits; some promising discoveries have already been made there; and indeed in almost every quarter of the State are the beginnings of developments that inspire great faiths, each in its own particular circle of prospectors and prophets

There is apparently no limit, in fact, to the growth of the mineral interests of Colorado. The product this year is from two millions to two and a half; next year it will be at least a million more, perhaps a million and a half, or four millions; and the increase will go on indefinitely. For the business is now taken hold of in the right way; pursued for the most part on strictly business principles; and every year must show improvements in the ways and means of mining and treating the ores. The mountains are just full of ores holding fifteen to fifty dollars' worth of the metals per ton; and the only question, as to the amount to be got out, is one of labour and cost as compared with the profits of other pursuits.

Mines, Mining and Miners, from Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

The settled population of Colorado is now at least 50,000, perhaps 60,000. About one-quarter is Mexican, all in the southern section, and ignorant and debased to a shameful degree. The rest are as good a population as any new State can boast of. They are drawn from all eastern sources; but the New England leaven, though possibly not the New England personality, is dominant in their ambition, their education, their morality, their progressive spirituality. The pioneer miners, the "prospectors," are a class of characters by themselves. Probably they never mine; to dig out and reduce ore is not their vocation; but they discover and open mines, and sell them, if they can; at any rate move on to discover others. Men of intelligence, often cultivated, generally handsome, mostly moral, high-toned and gallant by nature, sustained by a faith that seems imperishable, putting their last dollar, their only horse, possibly their best blanket, into a hole that invites their hopes, working for wages only to get more means to live while they prospect anew and further, they suffer much, and yet enjoy a great deal. Faith is comfort, and that is theirs; they will "strike it rich" some day; and then, and not till then, will they go back to the old Ohio, Pennsylvania, or New England homes, and cheer the fading eyes of fathers and mothers, and claim the patient-waiting, sad-hearted girls, to whom they pledged their youthful loves. The vicious and the loafers, the gamblers and the murderers, have mostly "moved on;" what is left is chiefly golden material; and the men and the mines and farms of Colorado, all alike and together, are in a healthy and promising condition, and insure for her a large growth and a generous future. The two things she lacketh chiefly now are appreciation at the East and women; what she has of both are excellent, but in short supply; but the railroad will speedily fill the vacuums.

MINES OF NEVADA.

From "The Times," Monday, January 22nd, 1869.

Mines of Nevada. ("Times.")

GLANCING over the Sierras Nevadas to the State of Nevada, we see its grand Comstock Vein (or collection of parallel veins forming one great belt), upon whose 600 yards of breadth, and three miles of length, stand two towns. The line of the lode is easily traceable, by the great dump piles at the forty or more perpendicular and inclined shafts, which sink

down to depths varying from 500 to 1,200 feet beneath the surface. Each of these shafts stands within a frame-house built to protect the engine, boilers, pumps, pipe, and hoisting apparatus, heretofore so necessary to draining and working each mine; and these engines have ordinarily been obliged to work ceaselessly, night and day, to keep the lode clear of water. Some of the mines have also pump-works underground. Beside these shafts the Comstock is tapped at various depths by tunnels—so that the visitor can suit himself as to whether he walks in from below the town, or is lowered down the shaft above. In either case, when he reaches the lower workings, he will be struck with wonder at their magnitude. A vast sloping cavity, some fifty or more feet wide, and of undeterminable length, has been worked out from where he stands to the surface. Great beams of pinewood, 18 inches thick, have been jammed lengthwise, as props, between the walls of this cavity, at distances of five feet from each other, and between these again, upright timbers of the same size have been closely jointed, so that, turn which way he will, going up or down, or along the workings, he can touch massive woodwork above, beneath, before, behind, and on either side of him, at any moment, a perfect forest of timbers. Here and there, in the different levels or floors, he sees the miners picking or shovelling, and wheeling ore from the breastworks or slopes, and he somewhat realizes the proportions of the Comstock when he learns that just in this way for three miles he would find them working to the number of 3,000. Poor fellows! in that sultry atmosphere of 100 degrees, where twenty-five per cent. of their strength is exhausted by the heat, they richly deserve the $3 50c. per day given them. And how much wood do you think there is used in the Comstock for timbering? To the value of nearly $1,000,000 per annum. Try to comprehend that there are close upon seventy miles of tunnels and shafts and drifts and slopes in the lode—an underground city much larger than that above. And this lode, which is owned by some fifty different companies, is said to supply about 1,800 tons of ore daily to seventy-six mills, in which 2,000 more persons are employed, and is officially stated to furnish employment, directly and indirectly, to 100,000 people. At the close of 1866 the mines on the Comstock had yielded, since their discovery in 1859, the enormous sum of $64,000,000. Since then they have produced, in 1867, about $17,500,000 and perhaps as much more may be estimated for 1868, which would give a total aggregate of $99,000,000 up to the close of 1868. There is no reason to suppose that this gigantic lode will ever cease its metallic supply as long as mining operations can be conducted in it. By the present mode of draining it is believed that a greater depth than 1,500ft. or 2,000ft. cannot be reached, but with the Sutro Tunnel, which, running from Dayton, four miles away, will cut the lode

Mines of Nevada. ("Times.")

Mines of Nevada. ("Times.")

2,000ft. from the surface—a depth of 3,000ft. can, by the aid of pumps, be drained and worked. It has been calculated that this tunnel, or adit, will thus add at least $1,000,000,000 to the silver yield, and if so, the Comstock lode will nearly or quite equal the Great Potosi of Bolivia, which yielded $1,200,000,000, and surpass the Vita Madre of Guanajuato, Mexico, from which $800,000,000 were taken, and the Vita Grande of Zacatecas, Mexico, from which was secured $650,000,000. There can be no question as to the necessity for such adits. Mines have been frequently "drowned out." One of the mines of Carthagena, in Hannibal's time, which yielded 3,000 crowns per day, escaped such a fate through having an adit 1,500 paces long driven into it through the mountain. The Sutro Tunnel, when finished, will be of no very uncommon length. There are some in Europe of 8, 10, 14 miles long, and before the Sutro Tunnel shall have worked out the promised $1,000,000,000, our children's children may walk along a 15 or 20 miles adit into the lowermost bowels of the Comstock. Adits are needed likewise to assist in securing good ventilation for the mines, otherwise the miners either cannot work or work poorly. Many of the Comstock companies are now putting in engines to drive ventilating fans which will supply fresh air, through galvanized iron tubes to the lower levels—but the Sutro Tunnel, when completed, will materially assist. They also carry off the usual flow of water from the workings, and thus diminish the vast expenses of deep mining. What such expenses are may be inferred from the estimate made early in 1867, by the Nevada Legislature, that the annual product of the Comstock, then (in 1866 and 1867) about $16,000,000 per annum, was gained at an annual expense of $15,500,000? This, however, seems to be greatly over-estimated; but under ordinary circumstances, with succeeding years, as the lode is worked deeper, the relative expenses in the item of drainage will increase, until the adit taps the lode. However, a Nevada paper states that with a recent great increase of heat in the mines comes also a greater decrease of water.—*New York Tribune.*

MINING IN COLORADO, U.S.

From the "Mining Journal," January 23rd, 1869.

Mining in Colorado.

IT may be of interest to many of your readers to know what is being done in Colorado in the way of developing mines, &c. There has been no time since Colorado was first discovered that its mines have paid so well as at present. New discoveries are daily being made here, and the richest ores ever known to exist in the territory have recently been discovered. At Georgetown, the centre of silver-mining operations, located at a point that four years ago was a wilderness, there are now five reducing-works erected, of very limited capacity. Messrs. Schinner and Breckner, proprietors of the principal reducing-works took off on Saturday, Dec. 12, 164 lbs. troy of silver bullion coin, value $2646·80. The amount of ore reduced to secure this amount of bullion was 7 tons (2000 lbs. to the ton). Messrs. Hupenden, Wolters, and Co. have just taken from retort, and shipped to New York $4454·65 in silver bullion from 21 tons of ore. Their mode of treating ores is by chloridising cylinders and amalgamation. This method is working very successfully on the sulphuretted ores found in this locality. Prof. Stewart produced 2615 ozs. of silver bullion in his small way of working, by a three-stamp mill, during the month of November. "If such results (says the *Colorado Miner*) could be obtained from the Comstock lode, Nevada, millions of capital would be eager to invest; but being situate in Colorado, where millions have been expended by inexperienced people in mining and worthless processes, capitalists have not the temerity to invest." The character of ores in this district is principally argentiferous galena, although many of the lodes carry silver glance (vitrous sulphide of silver), stephanite (brittle sulphide of silver), pyrargyrite (ruby silver), and chloride or horn silver. The principal lodes in this district are the Equator, Cascade, Terrible, South American (carrying stephanite, galena, and zinc blende), Wall street, Achilles, Aster, D. W. Yandall (carrying black and grey sulphurets of silver), U. S. Coin, Cataract, &c. These mines are capable of producing immense quantities of ore, and that of a class, too, that will average over $200 per ton. The miners are anxious to have capacious works erected here, and offer to parties that will build such works as are required to reduce the class of ores above mentioned to denote to them and deliver at their works from 1,000 to 2,000 tons of first-class ores. This should really be an inducement to parties that are accustomed to treating ores to at least investigate the matter, and see what merit there is in it. In South Park very little has been done during the past

Mining in Colorado.

year, although the richest gold mines in Colorado are at that point. The celebrated Orphan Boy lode has been worked by Messrs. Newlin Brothers and Cotes, with great success, they having obtained from $850 to $1,400 to the cord of ore. This lode, like all lodes in that district, is very large, the pay streak varying in width from 7 to 16 feet. The deepest shaft on the lode is 120 feet. New works are to be erected at this mine the coming spring by Messrs. Jefferds and Co., of Chicago, Illinois, who, by the way, have a well-demonstrated process of treating sulphuretted ores, by the introduction of certain gases into a furnace while the ores are roasting or being desulphurised. Messrs. George Lechner and Co. have been hard at work on a patch called the Ten Forty lode, located about one mile from the Orphan Boy lode. This lode is very peculiar in its formation, being on a flat several hundred feet in width. In this flat many cuts have been made to a depth of from 30 to 45 feet, developing a rich deposit of silver ore, which seems to lie in chambers or floors, found in magnesian limestone of the dolomite species, covered with calc and felspar. Three cuts or drifts have been run at right angles across the flat, exposing at a depth of 20 ft. four distinct layers or floors, 20 to 30 inches thick, of black and grey sulphurets of silver, thoroughly decomposed, and very rich, the lowest assays being over $1,000 to the ton. Other cuts or drifts are now being run at a depth of 45 feet, and show three other layers. There is now explored nearly 2,000 tons of the character of ore above described. The proprietor of this mine is now in New York, seeking capital to erect suitable works for the reduction of these ores. At Central City, the great central point of gold-mining operations in Colorado, great excitement has prevailed during the past month, caused by the discovery of a rich silver mine in that district. Robert Teats and Co. are working the ore, and obtaining from 600 to 1,000 ozs. of silver per day. All the mills in this locality are working full blast, and with good results. The bullion shipped from Central City amounts to from $250,000 to $300,000 per month, where two years ago it would hardly reach $50,000. Colorado is suffering from the want of experienced furnace-men and capital, especially in the silver districts, where its richest treasures lie.

PASTORAL AND AGRICULTURAL RESOURCES.

PASTORAL.

Up to this point our attention has been exclusively directed towards the mineral wealth of the estate. Its pastoral wealth is equally astonishing. In the language of Bishop Simpson, App. 2, "The pasturage of the plains and mountains is remarkable. The grasses are "very nutritious, and they cure standing. Cattle refuse to eat hay when they can have "access to the dry grass of the plains. Beef cattle that have not been fed on a pound of hay "or grain are frequently brought to market even in winter. The climate is mild and "healthful," &c., &c. Pastoral.

It is proved beyond doubt that the climate and pasturage of Colorado excel those of any other State in the United States for raising cattle and sheep. Epidemic diseases are unknown, while the natural increase is much greater than where beasts have to be sheltered and fed during the winter months.

EXTRACT FROM "THE NEW GOLD REGION:" By EDWARD BLISS. New York, 1861.

"Nearer the base of the rocky ranges, and along the valleys of the streams which have "their origin in the mountains, vegetation is more prolific and the soil more arable. The "grasses here are not only abundant, but grow to immense size, and contain more nutriment "than the cultivated species of the most prosperous agricultural districts of the Mississippi "valley. These grasses cure standing, and cattle have been known to feed and thrive upon "them throughout the entire winter months. As a great grazing and stock-raising region, "Colorado possesses advantages even over Texas, which has a world-wide reputation in this "respect. The latter is subject not only to terrible storms, but long-continued rains, which, "to unsheltered stock, are so fatal; while in Colorado no bleaching rains, no tornadoes

Pastoral. " destroy the standing grasses or waste their nutriment. For four successive winters— " excepting the last, which has been unusually inclement all over the country—there have " not been twenty days in each that our cattle required feeding; and it is a still more " remarkable fact, that they will not eat cured hay so long as they can have access to " ungrazed pasture lands. Beef cattle have often been driven, in the months of January " and February, direct from the fields to the shambles, and nowhere in the world can finer or " better beef be found than in the markets of Colorado.

" To such, then, as desire to engage in stock-raising, or dairy enterprise, the territory of " Colorado offers a field unequalled in the known world. Already extended efforts in this " branch of industry have met with most profitable returns."

One thousand ewes, properly herded, increase to 20,000 in five years' time.

One thousand cows increase to 7,000 head of cattle of all ages in the same period.

In sheep-farming, the sale of wool more than repays the entire expenses incurred in raising sheep, leaving the increase as clear gain. After the first year, the growing wethers become saleable, the quantity saleable increasing yearly. The proceeds of the sale of wethers from the increase of 3,000 ewes, should amount in five years to over £9,000 net profit, while the capital stock of 3,000 ewes will have increased in the interim to nearly 50,000, exclusive of the above net profit of £9,000 cash.

One thousand ewes drop each year about 1,700 lambs, and rear to the age of one year about 1,400.

Frequently a single ewe may be seen with four or even five lambs, while many ewes drop two or three lambs each.

The carcase of a full-grown native sheep weighs but about 32lbs., fleece 1½lbs., and in quality and weight both the sheep and wool could be much improved by the introduction of improved rams.

In the following table we take 1,000 only as the yearly increase of the same number of ewes, but, unlike cattle, the young females drop young the first year; while heifers, as a rule,

seldom drop calves before attaining the age of two years. Hence the increase of sheep is much more rapid than that of cows; besides which, the majority of young lambs are ewes, whereas in calves the sex is about equally divided. Pastoral.

As 3,000 ewes are considered a band, and herded together, we take that number, with 20 improved rams, as a starting point to illustrate the increase:—

Year.	Principal Ewes.	Ewes.	Wethers.	Total value of Saleable Wool and Sheep.	Expenses.	Net Profit of Herd.
1st	3,000	2,000	1,000	£625	£125	£500
2nd	5,000	3,333	1,667	1,121	208	833
3rd	8,833	5,889	2,944	1,820	348	1,472
4th	14,722	9,815	4,907	2,935	582	2,353
5th	24,537	16,358	8,179	5,062	973	4,089
	24,537					
	49,074	Sheep	at 10s. per	head.	Profit	£9,247
	49,074	Sheep				24,537
						£33,784

It will thus be seen that, in five years' time, besides making a net profit of £9,000, your sheep have increased from 3,000 to 49,000. In two years more from this period, the capital (or stationary stock) will have increased to over 100,000 ewes, which, without further increase of capital, ought to produce a yearly net profit of at least £50,000.

Cattle, on the contrary, are not self-supporting, like sheep, until after the expiration of four years. Out of the increase of 1,000 there would be fit for market, the fourth year, 400 head of beef.

The number of beef cattle fit for market would increase annually, as will be seen by reference to the following:—

Principal, 1,000 cows, and 40 (improved breed) bulls.

Year.	Cows.	H. Calves	B. Calves	Total.	Beef Saleable.	Value.	Total Expense.
1st	1,000	400	400	1,800			£250
2nd	1,000	400	400	2,600			354
3rd	1,400	560	560	3,720			600
4th	1,800	720	720	4,760	400	2,800	830
5th	2,360	944	944	6,348	400	2,800	1,176
6th	3,080	1,232	1,232	8,152	560	3,920	1,710
				27,480	1,360	9,520	£4,920

Pastoral.

It will be seen that the net profit arising from a herd of 1,000 cows, would be, in six years—

Value in Cash	£ 4,500
Ditto in Stock of all ages, 7,253 head, at £3	21,756
	£26,256

In three years from this date, the increased herd would amount to about 30,000 head of all ages, and the annual net income to about £30,000. Although £7 is taken as the value of beef cattle per head, in the preceding table, yet the average value for the past twelve years has been over £10 per head.

The markets of the east afford unlimited means for the disposal of thousands of head of beeves annually.

Cattle from this estate can be driven to a market town in the Eastern States, during the summer months, without other expense than merely the wages and keep of the drovers, which, in droves of 400 and upwards, should not amount to more than 4s. per head.

The large farmers who raise yearly thousands of bushels of corn (Indian Maize) are ready cash purchasers of all the grass-fed beef that arrives in the market towns on the Missouri river, as they immediately stall the cattle and fatten them with their surplus Indian corn, thus not only saving themselves the expense and uncertainty of the Eastern markets, but also enabling them to enrich their farms by the manure collected from the feed stable. After the cattle are thus fattened, they are termed stall-fed, and command a high price in the large markets of the East, where they are easily transported by rail in two days' time for shipment.

The eastern stock graziers, who have to feed and shelter their beasts four to six months in the year, cannot compete with graziers who raise stock without other expense than that of herding it.

EXTRACT FROM DILKE'S "GREATER BRITAIN."

If corn is impossible, cattle are not; already thousands are pastured round Denver on the natural grass. For horses, for merino sheep, these rolling table-lands are peculiarly adapted. The New Zealand paddock system may be applied to the whole of this vast region—Dutch clover, French lucern, could replace the Indian grasses, and four sheep to the acre would seem no extravagant estimate of the carrying capability of the lands. The world must come here for its tallow, its wool, its hides, its food. Pastoral. (Dilke.)

The most astounding feature of these plains is their capacity to receive millions, and, swallowing them up, to wait open-mouthed for more. Vast and silent, fertile yet waste, field-like yet untilled, they have room for the Huns, the Goths, the Vandals, for all the teeming multitudes that have poured and can pour from the plains of Asia and of Central Europe. Twice as large as Hindostan, more temperate, more habitable, nature has placed here—hedgeless, gateless, free to all—a green field for the support of half the human race; unclaimed, untouched; awaiting, smiling, hands and plough.

Irrigation by means of dams and reservoirs, such as those we are building in Victoria, is but a question of cost and time. The never-failing breezes of the plains may be utilized for water-raising, and with water all is possible. Even in the mountain plateau, overspread as it is with soda, it has been found, as it has been by French farmers in Algeria, that, under irrigation, the more alkali the better corn-crop.

AGRICULTURAL.

THE AGRICULTURE OF COLORADO.

From Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

The Agriculture of Colorado, from Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

INEXHAUSTIBLE as is Colorado's mineral wealth; progressive as henceforth its development; predominant and extensive as are its mountains; high even as are its valleys and plains,—in spite of all seeming impossibilities and rivalries, Agriculture is already, and is destined always to be, its dominant interest. Hence my faith in its prosperity and its influence among the central States of the continent. For agriculture is the basis of wealth, of power, of morality; it is the conservative element of all national and political and social growth; it steadies, preserves, purifies, elevates. Full one-third of the territorial extent of Colorado—though this third average as high as Mount Washington—is fit, more, rich for agricultural purposes. The grains, the vegetables, and the fruits of the temperate zone grow and ripen in profusion; and through the most of it cattle and sheep can live and fatten the year round, without housing or feeding. The immediate valleys or bottom lands of the Arkansas, and Platte, and Rio Grande, and their numerous tributaries, after they debouch from the mountains, are of rich vegetable loams, and need no irrigation. The uplands or plains are of a coarse, sandy loam, rich in the phosphates washed from the minerals of the mountains, and are not much in use yet except for pastures. When cultivated, more or less, irrigation is introduced, and probably will always be indispensable for sure crops of roots and vegetables; but for the small, hard grains, I have no idea it will be generally found necessary. It is a comparatively dry climate, indeed; but showers are frequent, and extend over a considerable part of the spring and summer.

At a rough estimate, the agricultural wealth of Colorado last year was a million bushels of corn, half a million of wheat, half a million of barley, oats, and vegetables,

50,000 head of cattle, and 75,000 to 100,000 sheep. The increase this year is at least 50 per cent.; in the northern counties at least 100. Indeed the agriculture of the northern counties, between the Pacific Railroad at Cheyenne and Denver, which has grown to be full half that of the whole state, is the development almost entirely of the last three years. South, in the Arkansas and Rio Grande valleys, the farming and the population are older, going back to before the gold discoveries. This is the Spanish-Mexican section, and was formerly a part of New Mexico. Its agriculture is on a large but rough scale, and only the immense crops and the simple habits of the people, chiefly ignorant, degraded Mexicans, permit it to be profitable. The soil yields wonderfully, north and south. There is authentic evidence of 316 bushels of corn to the acre in the neighbourhoood of Denver this season; 60 to 75 bushels of wheat to the acre are very frequently reported; also 250 bushels of potatoes; and 60 to 70 of both oats and barley. These are exceptional yields, of course, and yet not of single acres, but of whole fields, and on several farms in different counties. Probably 30 bushels is the average product of wheat; of corn no more, for the hot nights that corn loves are never felt here; of oats say 50, and of barley 40, for the whole State. Exhaustion of the virgin freshness of the soil will tend to decrease these averages in the future; but against that we may safely put improved cultivation and greater care in harvesting.

The Agriculture of Colorado, from Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

The melons and vegetables are superb; quality, quantity, and size are alike unsurpassed by any garden cultivators in the East. The irrigated gardens of the upper parts of Denver fairly riot in growth of fat vegetables; while the bottom lands of the neighbouring valleys are at least equally productive without irrigation. Think of cabbages weighing from 50 to 60 pounds each! And potatoes from 5 to 6 pounds, onions 1 to 2 pounds, and beets 6 to 10! Yet here they grow, and as excellent as big.

Let me borrow, in further illustration of the farming development of this country, some statistics of this year's cultivation in a few of the leading river valleys north and south. They are from Mr. Thomas's personal collections for the *Denver News:* The Cache-à-la-Poudre is the most northern side valley of Colorado, and markets at Cheyenne; it has at least 200,000 acres of tillable lands, and probably not 5,000 are in use yet; but among its chief products this year are 25,000 bushels of oats, 5,000 wheat, 5,000 potatoes, 2,500 corn, 2,500 tons of hay, and 15,000 to 20,000 pounds of butter. The oat crop averaged 48½ bushels per acre; and the cows have generally paid for themselves in butter this season. The Big Thompson, another of the northern valleys, has about 2,000 acres under

The Agriculture of Colorado, from Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

cultivation, and yields this year 33,000 bushels potatoes, with an average of 165 bushels per acre cultivated; 27,000 bushels oats, 8,000 bushels wheat, 3,300 bushels corn, 1,400 tons hay, and 7,500 pounds of cheese from a single dairy. One farmer has 700 to 800 head of cattle, and 100 to 200 horses and colts. In the Platte valley, for sixty miles north of Denver, or to the mouth of Cache-à-la-Poudre, there were raised this year 15,000 bushels wheat, 27,000 bushels oats, 5,000 bushels barley, 3,000 bushels corn, 7,000 bushels potatoes, and 1,500 tons of hay, and about 23,000 pounds of butter made. In the valley of the Platte, south of Denver, twenty miles long, there are 3,000 acres under cultivation, nearly half in wheat, and a quarter in oats, with crops of barley at 66 bushels to the acre, of wheat 70, and of oats 65, the average being 30 to 35 of wheat, 35 to 40 of oats and barley. Bear Creek, just south of Denver, has 1,225 acres cultivated, divided about as those of the Platte are. In the main valley of the Arkansas are nearly 6,000 acres of cultivated land, half corn, and a third wheat; in Fontaine qui Bouille, a branch of the Arkansas, also 6,000, with almost exactly the same division among crops. The St. Charles, another tributary, cultivates 1,500 acres, half corn, a third wheat, the rest oats. In the Huerfano valley, still another tributary of the Arkansas, are 5,000 acres under tillage, with the usual southern division, corn largely dominating, and here are some of the largest farms in the state, ranging up to 1,500 acres in cultivation, and so requiring but few farmers to make up the total. In this valley, the corn crop averages from 30 to 50 bushels the acre, wheat 20 to 40, and oats 40 to 45. These are but specimens of twice as many valleys above and below Denver, in which farming has been begun, but only begun, yet with such profitable results as insure rapid development.

I now quote the prices of agricultural produce this week at Denver; they will be likely to recede as the crops come into market: Barley 3c. a pound, corn 3½ to 4½c., cheese 20 to 22c., corn meal 5c., eggs 50 to 60c. a dozen, flour $7 to $9 a sack of 100 pounds, oats 3c. a pound, potatoes 2 to 3c. a pound, fresh tomatoes 3c. a pound, wheat 3¾c. a pound, cabbages 1c. a pound, butter 45c. a pound retail, chickens $5.50 a dozen, good beef 12 to 15c. a pound. At Cheyenne, on the Pacific Railroad, prices are somewhat higher,—like these, for instance, for vegetables: Cabbages 6 to 8c. a pound, onions 6 to 8c. a pound, turnips 2 to 4c. a pound, beets 5 to 7c. a pound, tomatoes 20 to 25c. a pound, squashes 4 to 7c. a pound, cucumbers 40 to 50c. a dozen. Beef is, on the whole, the cheapest grown and the cheapest selling food here. It costs about half the New York and Boston retail prices.

Stock-raising on the plains is a simple and profitable business. The animals can roam at will, and a single man can tend hundreds. The only enemies are the Indians and the diseases that the Texas cattle bring up from the South. But the former are the great evil; the confusion, danger, and loss they have created this season sum up a serious blow not only to stock-raising, but to all farming. Even if the evil is suppressed hereafter, this season's raids are a year's loss to the agricultural interests of Colorado. Many farmers have given up in despair from danger and disaster, and retired from the field; others hesitate and refuse to come, who otherwise would be here at once and in force of capital and energy, to enter upon the business.

The Agriculture of Colorado, from Bowles's "Summer Vacation in the Park and Mountains of Colorado."

These great interests of mining and farming shade naturally into others, and already there are the beginnings of various manufacturing developments, as there are the materials and incentives for such undertakings without stint. Some fifteen or twenty flouring-mills are in operation throughout the State. The Colorado wheat makes a rich hearty flour, bearing a creamy golden tinge; and I have eaten nowhere else in America better bread than is made from it. There is a baker in Georgetown, whose products are as rich and light as the best of German wheat bread. The wheat will rank with the very best that America produces, and is more like the Californian grain than that of "the States." Coal-mines are abundant, and several are being profitably worked along the lower range of the mountains; as, indeed, they have been found and opened at intervals along the line of the Pacific Railroad over the mountains, and are already supplying its engines with a most excellent fuel,—a hard, dry, brown coal, very pure and free-burning; in Boulder valley and Golden City, iron is being manufactured from native ore; at Golden City, there is a successful manufactory of pottery ware and fire brick; also a paper-mill and a tannery, and three flouring-mills; the State already supplies its own salt; soda deposits are abundant everywhere, and will be a great source of wealth; woollen mills are projected and greatly needed, as wool-growing is the simplest of agricultural pursuits here; a valuable tin mine has been lately discovered and its value proved, up in the mountains; and next year the railroad will be one of Colorado's possessions, and bring harmony and unity and healthy development to all her growth, social, material, and political. Also, by that time she will be a State, and so responsible for her own government, be it good or bad.

As we go out, Professor Agassiz leads a new party of eastern notables from over the plains and into the mountains. He is already seething with enthusiasm; all Brazil was

The Agriculture of Colorado, from Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

nothing, he says, to what he has seen of natural beauty and scientific revelation in crossing the plains; but the half is not told him. When he comes face to face with the mountains—the mountains in perfection and the mountains in ruin—and their phenomena of parks and wealth of verdure, then indeed he may feel he is among the "Gardens of the Gods." The professor finds abundant materials to sustain his wide-spread glacial theories; all these vast elevated plains, from Missouri River to mountains, from Montana to Mexico,—the very heart of the continent,—are but in his eye the deposit of great fields of ice, stretching down from these hills and washing down their heights. What must they have been once to have lost so much and remain so Titanesque!—to be still the Mother Mountains of the Continent?

MISCELLANEOUS.

SALUBRITY OF CLIMATE.

COLORADO AS A SUMMER RESORT: By BAYARD TAYLOR.

Colorado as a Summer Resort. (Bayard Taylor.)

WHOEVER comes to the Rocky Mountains with pictures of the Alps in his memory, expecting to find them repeated on a grander and wilder scale, will certainly be disappointed. He will find no upper world of unbroken snow, as in the Bernese Oberland; no glaciers, thrusting far down between the forests their ever-moving fronts of ice; no contrast of rich and splendid vegetation in the valleys; no flashing waterfalls; no slopes of bright green pasturage; no moss; and but rarely the gleam of lakes and rivers, seen from above. With no less lofty chain can the Rocky Mountains be measured, it is true; but it is merely a general comparison of height, not of resemblance in any important feature.

In the first place, the atmospheric effects are those which result from the intense dryness of the heart of a continent in the temperate zone. The Alps not only touch the Mediterranean at either extremity, but are no further from the Atlantic than it is from Denver to the Missouri River. Four or five cloudless days in succession are considered a rare good fortune by the tourist; the higher peaks are seldom without their drapery of shifting cloud. Here a clear sky is the rule. There is seldom vapour enough, except just at present during the brief rainy season, for the artist's needs. Perspective is only obtained by immense distances. The wonderful, delicate grays of the mountain landscapes demand changes of light and shadow which are often lacking; they lie too barely in the broad unobstructed sunshine. Yet an air more delicious to breathe can scarcely be found anywhere. It is neither too sedative, nor too exciting; but has that pure, sweet, flexible quality which seems to support all one's happiest and healthiest moods. Moreover, it holds in solution an exquisite variety of odours. Whether the resin of the coniferous tree, the balm of the sage-bush, or the breath of the orchis and wild rose, it is equally grateful and life-giving. After a day in this atmosphere, you have the lightest and most restorative slumber you ever knew.

Colorado as a Summer Resort. (Bayard Taylor.)

On first entering the Rocky Mountains, you find the scenery rugged, cramped, and somewhat monotonous. Press forward, and they open anon; the higher the summits become, the more breadth of base, the clearer outline they demand. They push away the crowd of lower ridges, leaving valleys for the streams, parks with every variety of feature, and finally gather into well-defined ranges, or spurs of ranges, giving you still broader and grander landscapes.

The San Luis Park, from the accounts I have heard, must be equally remarkable. It is on a much grander scale, and has the advantage of a milder climate, from its lesser elevation above the sea-level. The North Park is rarely visited, except by an occasional prospector or trapper. It has no settlement as yet, and I have met with no one who has thoroughly explored it. There are a number of smaller parks on both sides of the main chain, and some of them are said to possess great natural beauties. The singular rock formations at the eastern base of the mountains furnish in themselves a rare and most original field for the tourist and the artist. The glimpse I had of those on the south bank of the Platte, on my return from the South Park, satisfies me that they surpass in magnitude and picturesque distortion the celebrated basaltic formations of Saxony.

I do not think the parks and the upper valleys of the mountains will produce anything except hardy vegetables, and perhaps barley and rye. But they abound with the richest grasses; and "Colorado cheese" may one day be as celebrated as Gruyère or Neufchatel. They offer precisely those things which the summer tourist seeks—pure air, lovely nights, the finest milk, butter, trout, and game, and a variety of mineral springs. The summer climate I know; and I am told that the winter is equally enjoyable. It sounds almost incredible to hear of persons in the latitude of New York, 8,000 feet above the sea, rarely needing an overcoat during the whole winter season. There is a great depth of snow, and an occasional severe day, but the skies are generally cloudless, and the air temperate and bracing. The extremes of heat and cold are greater in Denver than in the mountains. As nearly as I can learn, the coldest weather yet experienced in San Luis Park was seven degrees below zero; in the Middle Park, fifteen degrees; and in Denver, thirty degrees below.

I hazard nothing, at least, in predicting that Colorado will soon be recognized as our Switzerland. The enervated luxury, the ignorant and imitative wealth, and the overtasked

business of our cities, will come hither, in all future summers, for health, and rest, and recreation. Where Kit Carson chased Arapahoes, and Frémont's men ate mule-meat, and Jim Beckworth went through apocryphal adventures, there will be drawling dandies, maidens both fast and slow, ungrammatical mammas, and the heaviest of fathers. The better sort of people will come first, nor be scared away afterward by the rush of the unappreciating. We shall, I hope, have Alpine clubs, intelligent guides, good roads, bridges, and access to a thousand wonders yet unknown. It will be a national blessing when this region is open to general travel. That time is not now distant. Before the close of 1868, Denver will only be four days from New York, and you can go through with one change of cars. Therefore I am doubly glad that I have come *now*, while there are still buffaloes and danger of Indians on the plains, camp-fires to build in the mountains, rivers to swim, and landscapes to enjoy which have never yet been described.

Colorado as a Summer Resort. (Bayard Taylor.)

The weather continues intensely hot by day, with cool and perfect nights. Sometimes the edge of the regular afternoon thunderstorm overlaps Denver, and lays the hot dust of the streets. These storms are superb aërial pictures. After they pass, their cloudy ruins become the material out of which the setting sun constructs unimaginable splendours. If I were to give the details of them, it would seem like colour run mad. Such cool rose-gray, such transparent gold, such purple velvet as are worn by the mountains and clouds, are fresh wonders to me every evening. The vault of heaven seems ampler than elsewhere; the lines of cloud cover vaster distances—probably because a hundred miles of mountains give you a more palpable measure of their extent—and your eye recognizes infinite shades, gradations, and transitions either unseen before or unnoticed. This amplification of the sky and sky-effects struck me when I first entered upon the plains. It is grand, even there; but here, with such accessories, it is truly sublime.

I do not now wonder at the attachment of the inhabitants of the territory for their home. These mountains and this atmosphere insensibly become a portion of their lives. I foresee that they will henceforth be among the clearest and most vivid episodes of mine.

SANITARY EFFECTS OF MOUNTAIN AIR IN CASES OF CONSUMPTION.

From Ruxton's "Adventures in Mexico and the Rocky Mountains."

Effects of Mountain air in cases of Consumption. (Ruxton.)

IT is an extraordinary fact that the air of the mountains has a wonderful restorative effect upon constitutions enfeebled by pulmonary disease; and of my own knowledge I could mention a hundred instances where persons, whose cases have been pronounced by eminent practitioners as perfectly hopeless, have been restored to comparatively sound health by a sojourn in the pure and bracing air of the Rocky Mountains, and are now alive to testify to the effects of the revigorating climate.

That the lungs are most powerfully acted upon by the rarified air of these elevated regions, I myself, in common with the acclimated hunters, who experience the same effects, can bear witness, as it is almost impossible to take violent exercise on foot, the lungs feeling as if they were bursting in the act of breathing, and consequently the hunters invariably follow game on horseback, although, from being inured to the climate, they might be supposed to experience these symptoms in a lesser degree.

Whatever may be urged against such a climate, the *fact* nevertheless remains, that the lungs are thus powerfully affected, and that the violent action has a most beneficial effect upon these organs when in a highly diseased state.

The elevation above the level of the sea, of the plains at the foot of the mountains, is about four thousand feet, while the mountain valley of the Bayou Salado must reach an elevation of at least eight or nine thousand, and Pike's Peak has been estimated to exceed twelve thousand.

ROADS AND RAILWAYS.

THE PONCHO PASS: By BAYARD TAYLOR.

The Poncha Pass. (Bayard Taylor.)

THE Pass at the head of the Arkansas Valley is probably the lowest between the South Pass and Santa Fé, but on each side of it the ranges rise rapidly above the line of perpetual snow. That on the east, which we had just crossed, is merely a long spur of the Rocky Mountains, dividing the South Pass from the Arkansas Valley. It gradually diminishes in height, and finally terminates altogether at Cañon City, where the river issues upon the plains. The range on the west, called the Sahwatch, is at first the dividing ridge of the continent, lifting its serrated crest of snow to the height of 14,000 feet. In the course of 50 or 60 miles, however, it divides; the eastern branch uniting with the Sangre de Cristo and Raton Mountains, while the western becomes merged in the Sierra Madre of New Mexico, dividing the waters of the Gila from those of the Rio del Norte. The Sahwatch Range is one of the most beautiful of the various divisions of the Rocky Mountains. Its forms are even finer than those seen from Denver. The succession of tints is enchanting as the eye travels upwards from the wonderful sage-gray of the Arkansas bottom, over the misty sea-gray of the slopes of buffalo-grass, the dark purplish green of fir forests, the red of rocky walls, scored with thousandfold lines of shadow, and rests at last on snows that dazzle with their cool whiteness on the opposite peaks, but stretch into rosy dimness far to the south.

Counting the gradual lower slopes of the mountains on either side, the Arkansas Valley is here five or six miles in breadth; and you may therefore imagine the splendid morning landscape in pearly shadow, the Sahwatch illuminated from capes of timber, and sage-plains spangled not less with flowers than with dew, as we rode southward toward the Twin Lakes.

THE PACIFIC RAILROAD.

From Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

The Pacific Railroad, from Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

TO-DAY the Pacific Railroad climbs over the line that separates the waters of the oceans. We sit astride the crest of the continental mountains, and see the last rail on the Atlantic slope and the first on the Pacific fastened down. It is an era in our lives—it is an era in our national life. Three years ago the Pacific Railroad was hardly commenced—not a rail was laid this side of the Missouri River—now there are eight hundred miles of iron track from the river west; on the other side from the Pacific Ocean east, six hundred miles are laid; and early in 1869—while you are reading these pages, my friend—the Continent will be spanned, and the cars will run from ocean to ocean. Only the energy of a Republic could perform such a work in so brief a time.

Three summers ago, our little party of four persons were ten days and nights in stages in reaching this point from the Missouri River; now our larger party of a dozen have been swept up hither in a day and a half from Omaha, and two days and a half from Chicago. Another year the journey from Boston to San Francisco, that then occupied a full month, will be compassed in a single week. Dividing the across-the-continent trip into thirds, this crest of the mountains is two-thirds the way from the Atlantic to the Pacific. Chicago is twelve hundred miles from Boston; here we are, twelve hundred miles from Chicago; and about the same distance from San Francisco in the other direction.

Whether you come west to Chicago by Erie or New York Central, by Pittsburg and Fort Wayne, by Michigan Southern or Michigan Central, leaving at the same hour you are swept into Chicago at the very same moment. The thousand mile journey is run on either route to one schedule of time. Passengers, who part at the supper-table at Rochester, bow to each other out of the rival car windows, twenty-four hours later, at the junction of the two Michigan roads in the outer suburbs of Chicago; while those who bade each other good-bye in New York twelve hours earlier, race along side by side on the Fort Wayne and Michigan Southern roads, through the slaughter-house and bone-boiling adjacencies of the great city of the North-west, to their neighbouring station-houses.

PULLMAN CARS.

It seems strange that in this new and rough West of ours, where the fight is fresh with all the elements of nature, and ease and luxury, if not despised, at least are generally postponed, there should be more comfortable and luxurious accommodations for railway travel than anywhere else in the world. Yet it is so. Europe and the Atlantic States provide on none of their railways as yet so elegant and ease-giving carriages as the saloon and sleeping and refreshment cars that are offered to travellers on the long routes of the West. They are the invention of Mr. George W. Pullman, who has thus asssociated his name for ever with one of the greatest improvements in railway travel. Some are provided with kitchen and larder, and will furnish at any hour a meal that rivals Delmonico; and the traveller can leisurely eat breakfast or dinner from his own little private table, as the train sweeps along at the rate of twenty or thirty miles an hour. Their broad, luxurious seats or sofas by day are turned at night into generous beds with clean linen and close curtains if you would have them. The ventilation is perfect; the freedom from dust and cinders only tolerably so; but the chief limitation is in the way of toilette accommodations. One disposed to abandon himself or herself to privacy and much water, in this respect chafes somewhat at the common corner and wash-bowl and single looking-glass, however elegant and cleanly; but when a dozen to forty people undertake to keep house for three days or a week in a single car, there must be some sacrifices of fastidiousness to the spirit of travel. That the Pullman car demands so few is the wonder.

The Pacific Railroad, from Bowles's "Summer Vacation in the Parks and Mountains of Colorado."

These cars are owned by companies distinct from the railroads, and added to the trains of the latter by special arrangements. Additional charges are made to passengers who occupy them, varying with the amount of room and service taken, but about on a par with the prices of first-class hotels for lodgings and meals. To enjoy their comforts to the full, a party of a dozen or twenty should charter the exclusive use of one; and when the continental pleasure travel to the Pacific sets in next year, this will be a very common fashion. Starting from Boston, New York, Niagara, or Chicago, in your Pullman parlour, dining-room, and bed-room, with servants to attend to all wants, the journey to San Francisco may be made with a degree of comfort and luxury unequalled heretofore in all the dreams of travel, and without necessarily leaving the car from the beginning to the end of the three-thousand-mile ride.

GOVERNOR GILPIN OF COLORADO.

From Mr. Hepworth Dixon's "New America."

Governor Gilpin. (Dixon.)

WILLIAM GILPIN is perhaps the most noticeable man on the Plains, just as Brigham Young is the most noticeable in the Salt Lake Valley; and it would hardly be a figure of speech to say that his office in Denver (a small room in the Planter's House, which serves him for a bedroom, for a library, for a hall of audience, for a workshop, and the upper ten thousand of Colorado, generally, for a spittoon) is the high school of politics for the gold regions and the mountain districts. By birth Gilpin is a Pennsylvanian—by nature and habit a state founder. Descended from one of the best Quaker families of his State (his ancestor was the Gilpin who came out with Penn and Logan); taught by history the need of that large and graceful tolerance of religious sentiment which Penn displayed in the court of Charles the Second, which the Friends have put into practice on the Susquehanna; and armed by nature with abundant gifts of genius—patience, insight, eloquence, enthusiasm; he has played, and he is now playing, a singular and dramatic part in this western country. He describes himself to me as in sympathy a Quaker-Catholic; that is to say, as a man who embraces in his single person the extremes of religious thought—the feeling of personality with the dogma of authority—the laxest forms of liberty with the sternest canons of order; an unusual blending of sentiments and sympathies—one not made in a day, not springing from an individual whimsy, but the result of much history, of long family tradition, and nowhere, perhaps, to be found in this generation except on the frontier-land which unites Quaker Pennsylvania with Catholic Delaware. Gilpin abounds in apparent contradictions. A Quaker, he is also a soldier—a West-Pointer—and of singular distinction in his craft. He bore a prominent part in the Mexican war, was the youngest man in the army who attained the rank of lieutenant-colonel, and but for his resignation, on moving out West, would have been the superior officer of Grant and Sherman. It is a happy circumstance for him that no call of duty made it necessary for him to hold prominent command against any section of his countrymen during the civil war. Gilpin's work is in another field—in the Great West, of which he is the champion and the idol, and which he has given his mind to explore, to advertise, to settle, and to subdue.

From "Greater Britain," by Charles Wentworth Dilke, Esq., M.P.

We have been called upon here (Denver) by Governor Gilpin and Governor Cummings, the opposition governors. Gilpin is a typical pioneer man, and the descendant of a line of such. He comes of one of the original Quaker stocks of Maryland, and he and his ancestors have ever been engaged in founding States. He himself, after taking an active share in the foundation of Kansas, commanded a regiment of cavalry in the Mexican war. After this he was at the head of the pioneer army which explored the *parcs* of the Cordilleras and the territory of Nevada. He it was who hit upon the glorious idea of placing Colorado half upon each side of the Sierra Madre. There never in the history of the world was a grander idea than this. Any ordinary pioneer or politician would have given Colorado the "natural" frontier, and have tried for the glory of the foundation of two States instead of one. The consequence would have been a lasting disunion between the Pacific and Atlantic States, and a possible future break-up of the country. As it is, this commonwealth, little as it at present is, links sea to sea, and Liverpool to Hong Kong.

Governor Gilpin. (Dilke.)

PART II.

THE

PARKS OF COLORADO:

WITH A DESCRIPTION OF THE

SANGRE DE CRISTO GRANT,

IN THE

SAN LUIS PARK

INTRODUCTION.

ONE of the most remarkable characteristics of the physical structure of that portion of the United States of America lying west of the Mississippi river is the unique system of parks or upland valleys lying at an elevation of some 6000 feet between the great chains of the Rocky Mountains. Introduction.

These mountain valleys, from their area, beauty, fertility, mineral wealth, and salubrity of climate, have attracted for the past few years, not only the attention of the hardy miner and settler, but also that of some of the leading men of the scientific world. The principal and most interesting of these Parks are the "North," "Middle," "South," and "San Luis," the latter of which equals the aggregate area of the three former, and from its southern position and the character of its surrounding mountains, is far superior to the others in point of climate, fertility, and mineral wealth.

THE SAN LUIS PARK.

This park is situate in the southern part of Colorado, and is about 200 miles from north to south, with an average in width from east to west of about 100 miles. It is easily entered from the north by the "Poncho," and from the east by either the "Sangre de San Luis Park

San Luis Park. Cristo" or "Mosca" Passes, through all of which are excellent wagon roads. The great highway for the mails, merchandises, and military stores from the north and east to Santa Fé, New Mexico, and Arizona traverses the "Sangre de Cristo" Pass and trends thence southwards through the San Luis Park to Santa Fé. The continuation also of the Union Pacific Railway, Eastern Division, from St. Louis to San Francisco, by the Great Southern or Kansas Route, has been surveyed, and will probably enter the San Luis Park by either the Poncho or Sangre de Cristo Pass.

The park, encircled by the two main ranges of the Rocky Mountains (the Cordillera on the east, and the Sierra Miembres on the west), is elliptical in shape, and bisected from north to south by the "Rio Grande del Norte," more usually called the "Rio Grande," which, rising in the San Luis Park, flows southwards, and ultimately empties itself into the Gulf of Mexico.

The park is also drained and irrigated by a number of other rivers, which, having their sources in the surrounding mountains, flow from all directions, but principally from the east and west, until they mingle their waters with the Rio Grande.

THE SANGRE DE CRISTO GRANT.

Sangre de Cristo Grant. About twenty-five years ago the attention of M. Charles Beaubien, an intelligent Frenchman and naturalised citizen of Mexico, was directed by some scientific gentlemen and officers attached to one of the United States Exploring Expeditions to the extreme fertility, salubrity, and mineral wealth of the San Luis Park, and as they spoke of the land in this park as being very superior and most desirable for settlement, M.

Beaubien proceeded to the spot, and having verified their representations by personal examination, upon his return applied to the Governor-General of Mexico for a grant of the best portion of the Park. Sangre de Cristo Grant.

The tract applied for being very extensive, M. Beaubien described the territory by its natural metes and bounds, the Rio Grande being one boundary and the mountains another, in lieu of specifying in the ordinary way the number of square leagues. The grant was made to him by the Mexican Government in 1845, and on the 21st of June, 1860, after this part of Mexico had been ceded to the United States, it was confirmed to him by special Act of Congress of the United States.

The territory thus acquired was named, and has since been known as, the "Sangre de Cristo Grant." In form it is an irregular parallelogram, about 55 miles in length, and 35 miles in width. Its area is from 1600 to 1800 square miles, or from 1,000,000 to 1,200,000 acres of land. Compared, therefore, with English counties, it is nearly the same size as Northumberland, Lancaster, or Norfolk, or rather larger than either Hampshire or Somerset.

The entire estate is clothed with pastures perennial in character; so that domestic stock of all kinds thrive throughout the entire year on the rich and nutritious grasses which it produces.

The lands may be classified as follows:—

1st.—About one-half of the area is composed of arable lands, a third portion of which, or about 200,000 acres, consists of rich bottom lands or valleys, bordering the numerous rivers and streams, and is of the highest grade of fertility.

Sangre de Cristo Grant.

2nd.—The remaining portion of the arable lands, or about 350,000 acres, consists of second bottom, or upland terraces, is of a lighter and more genial soil, and is covered with a heavy growth of wild sage, indicative of its great fertility.

3rd.—The remaining half of the area of the estate, or about 600,000 acres, consists of mountain lands of mineral character. The last-mentioned lands are densely timbered.

RIVERS.

Rivers.

The estate is bounded on the west for a distance of upwards of 40 miles by the Rio Grande, which is a large limpid river, about 100 yards in breadth, into which flow, at distances of from 12 to 15 miles apart, the Trenchera, Culebra, and Costilla rivers. These streams, with their branches and tributaries, take their rise in the mountains in the eastern part of the estate, and, flowing thence in a westerly direction, empty themselves into the Rio Grande.

This system of rivers not only affords ample water-power for manufacturing purposes, but their natural position is such as to bring all the arable land within ready means of irrigation.

MOUNTAINS.

Mountains.

The eastern boundary of the estate is the summit of the Rocky Mountains, whose crest and abrupt slopes are a homogeneous mass of porphyritic quartz. This is the mother rock of gold, containing that metal in a permeated form, in the same way as the sea holds salt.

This gold-bearing formation, occupying the highest elevation, engrosses about one-fourth of the entire estate. The lower slope of the

mountain lands, of about equal area, less abrupt, but mountainous, well timbered and full of miniature valleys clothed with fine herbage, is of homogeneous metamorphic quartz, containing crevices and lodes almost unlimited in number, and infused with rich ores of gold, silver, copper, lead, &c. In fact, the entire range of the precious and base metals are found within these two formations. Mountains.

RESOURCES.

It would be almost impossible, in this brief description, to enumerate all the resources, existing and latent, of the Sangre de Cristo property; an estate rich alike in its pastures and arable lands, in mineral wealth, in natural facilities for manufacturing purposes, and in climate. A glance at the following heads, however, will give some idea of the resources and capabilities of the estate. Resources.

PASTORAL RESOURCES.

An estate where all kinds of domestic animals thrive and increase throughout the year, without other food or shelter than the natural resources of the estate afford, is, necessarily, the place where stock can be raised for market at the least possible cost. Epidemic diseases are here unknown; and the only expense attendant upon the breeding of stock is the actual cost of men or boys for herding and keeping it from roaming too far away. The cost of raising cattle to the age of four years is estimated at less than one pound sterling per head; while the cost of raising sheep to the age of one year is less than sixpence per head. It is estimated that the increase of cattle upon this estate is about 50 per cent. annually, while that of sheep is nearly twofold that amount. As there is an open plain over Pastoral Resources.

Pastoral Resources.

which cattle and heavy merchandise wagons are passing during nine months of the year between the estate and the thickly settled parts of the so-called Western States, cattle and sheep can, at a trifling expense, be delivered at any of the large towns on the Missouri River, where there is a great demand for grass-fed cattle, by the large corn (Indian maize) growers of the States of Missouri, Iowa, Kansas, Illinois, Indiana, &c., who purchase grass-fed cattle in large herds, and stall-fat them upon their own farms. The cattle, when fatted, are shipped by rail to New York city and the large eastern cities, where they find ready purchasers at advanced prices that well repay the western farmer.

The average value of these cattle delivered to the corn-grower and stall-feeder for the past five years has been upwards of £15 per head.

A stock-raiser upon this estate, commencing with a principal of, say, 500 cows, or a cash investment of about £3000, would, after the expiration of four years, have for market, not less than 200 head of beeves, which gives him a net profit of as much as his original outlay.

The profit of sheep-raising is about the same as of horned cattle; but, by the introduction of improved rams, both the size and quality of the sheep and wool could be greatly improved upon.

It will thus be seen that the pastoral resources of the Sangre de Cristo can be turned to great and immediate profit. Stock-raisers, having large flocks and herds, frequently let out upon shares cattle and sheep, receiving from the herdsman 20 per cent. per annum in kind; and at the expiration of the term, which is usually five years, the principal is paid back in cattle or sheep of the same age as those originally received. This custom not only keeps the owner's

principal intact and of the same age, but gives him 20 per cent. per annum net income, and leaves the recipient a large flock or herd of his own. Pastoral Resources.

ARABLE LANDS.

The facilities for irrigating the entire area of bottom and upland terrace lands render the production of all cereals, bulbs, and roots easy and certain. It is an established fact that all crops raised by irrigation produce more to the acre than where, notwithstanding the highest state of culture and fertilization, the farmer depends upon rain. Arable Lands.

Wheat, barley, oats, rye, buck-wheat, &c., are here produced bountifully, and the grain is plump and full, so that a measured bushel weighs several pounds more than the standard bushel. By the rude method practised among the present settlers, the yield of wheat is about 40, barley about 50, and oats about 60 bushels per acre; and this return can certainly be increased at least 30 per cent. by improved culture and appliances.

Potatoes, beets, turnips, carrots, swedes, and cabbages grow to a gigantic size, retaining their flavour and tenderness, potatoes weighing 5 lbs. each, and cabbages of 40 lbs. weight not being looked upon as curiosities.

One of the great advantages attendant upon irrigation is that, whilst you have continuous sunshine, you are enabled to water your crops at the time and to the exact extent required.

MINERALS.

Minerals.

So far as yet ascertained, the lodes and ledges upon this estate have every indication of being richer and more strongly defined than in any other part of Colorado. The richness of the ores of Colorado are well and favourably known, both in the eastern cities of the United States, and also in Swansea, where large quantities have been and are being shipped for reduction. At the Paris Exhibition of 1867 the gold medal was awarded to Colorado for its ores.

Mining and the manufacture of the precious and base metals can be carried on upon this estate with the following advantages :—

1st.—Accessibility of the lodes and ledges.

2nd.—Abundance of fuel, and its proximity to the mines.

3rd.—Ample water-power, and its distribution over all parts of the estate.

4th.—Low price of resident labour, and small cost of all the necessaries of life.

5th.—Equable and salubrious climate, rendering out-door work pleasant throughout the year.

6th.—Advantageous position of the mines, adjoining rich arable and pastoral lands, where all the necessary supplies for man and beast can be produced.

With the foregoing advantages, it would be a matter of difficulty, if not impossibility, to point out in any other part of the world a section surrounded by so many circumstances conducive to the successful development and working of mines of both the precious and base metals.

MANUFACTURES.

Manufactures.

The branches of trade and manufactures which must of necessity follow the colonization and the development of this estate are innumerable, but those which will take the initiative are:—

1st.—*Saw Mills*, for building and mechanical purposes. The facility for the erection of water saw-mills and the abundance of pine timber render this very feasible.

2nd.—The manufacture of *Bricks* by steam or water-power, for which, owing to the dryness of the atmosphere, the abundant supply of fuel, and the quantity of suitable clay for the purpose, there are great facilities.

3rd.—*Flouring Mills*, for making flour and meal for home consumption and export.

4th.—*Distilleries* and *Breweries*, for the manufacture of spirituous and malt liquors.

5th.—*Woollen Mills*, which, on account of the low price of wool (3d. per pound), and clear water for power and washing, could be run at great advantage. At present, all woollen fabrics, both of fine and coarse texture, are brought from the east at a heavy rate of freight; and as the price of wool is higher in the east than upon this estate, large profits would accrue from the manufacture of blankets, carpets, coarse clothing, and woollen goods, for all of which articles there is a great demand.

6th.—*Tanneries.* There is no reason why the hides and skins should be transported to the eastern States, there turned

Manufactures. into leather, and re-shipped to this district for consumption, as there is every facility for tanning them on the spot.

7th.—*Potteries.* The varied earths and clays of the estate, and the home and foreign demand for all kinds of china and earthenware, offer great inducements for the erection and working of potteries.

In fine, the colonisation and development of this estate will cause a demand for many other branches of manufacture too numerous to mention.

REQUIREMENTS.

Requirements. The development of the resources of an estate larger than most of our English counties is beyond the limits of ordinary private enterprise and capital. Time, also, is necessary and important, and with the view to the development of the property with as little delay as possible, the owners are desirous of obtaining the co-operation of capitalists; whilst they feel satisfied that, with a judicious and economical expenditure of a moderate amount of capital, and by colonisation of portions of the estate, its value will within a very few years be at least quadrupled, and that the profits which will be realized will exceed the most sanguine expectations.

The extreme salubrity of the climate of the San Luis Park,* combined with its natural resources, productiveness, and accessibility, offer great inducements for emigrants of the middle-classes, who, with far less capital than is requisite either in Australia, New Zealand, or the Cape, will be enabled to obtain the most lucrative returns from the raising of

* Vide Report of Professor Hayden, p. 34; and of Dr. M'Clellan, p. 54.

stock; besides which, this Park is within eighteen days' instead of several months' journey from England. The fee simple of the lands in this district can also be acquired at the present time for permanent settlement, upon more favourable terms than in either Australia, New Zealand, or Canada. Requirements.

The prospective future increase in value of this estate is not less than that of the most favoured parts of California, or of any of the other States or Territories of the United States; the more especially as its mineral wealth and productiveness equals if it does not exceed them. Without referring to the rapid development of any of the cities of California, we will take, for example, two out of many instances of the increase in value and population which have recently occurred in the more immediate neighbourhood of the San Luis Park.

DENVER CITY is situated about 200 miles north of this estate; it is now one of the most beautiful and prosperous of the Western Cities. In 1859 the first house was erected. The city now contains about 7000 inhabitants; whilst there are large blocks of brick and stone buildings, a United States Branch Mint, many churches, as well as schools and public buildings. Building plots, which sold in 1859 for $30, five years afterwards brought as much as $1000 each, and have since been sold for sums varying from $8000 to $15,000 according to location and desirability.

CENTRAL CITY, the capital of Gilpin County, and about 150 miles north of the estate, was settled about the same time as Denver, and has now a population of upwards of 4000 inhabitants. Choice building lots containing about one-tenth of an acre, have recently been sold for as

Requirements.

much as from $7000 to $10,000 each. A few years ago these lots might have been purchased for a few dollars.

There is every reasonable prospect that within the next ten years, as the colonisation and settlement of the estate progress, several cities, equalling possibly, in size, population, and importance, the best in Colorado, will be located on the Sangre de Cristo Grant.

In directing attention to this property, it has been desired rather to give a moderate idea of the estate than to over-estimate its advantages, resources, climate, and capabilities.

The following official reports and opinions given by well-known and reliable authorities, and who, with the exception of Governor Gilpin, are not interested in the estate, are submitted in confirmation of the accuracy and truth of the foregoing description of this property.

A DESCRIPTION OF THE SAN LUIS PARK AND THE SANGRE DE CRISTO GRANT, COLORADO: BY EDWARD BLISS, AUTHOR OF THE "GOLD FIELDS OF COLORADO," &c.

PROGRESS AND RESOURCES OF COLORADO.

Description of Colorado, by Mr. Bliss.

THE march of civilisation and progress has for many years set steadily in a westerly direction. Central and Western Europe—seeking for an outlet to their overflowing population—have never once turned their attention to the vast extent of unoccupied territory to the eastward, but have persistently looked across the Atlantic to the western hemisphere for room for their surplus population. In our own country, too, the migratory inclinations of the people take them to the west; very few, comparatively, deflecting to the south, where a more genial climate and a more varied productiveness would seem to attract investigation and induce settlement.

For twenty years the tide of emigration has been flowing uninterruptedly in an almost due west course. The magical growth and development of California has been succeeded by other important discoveries and explorations west of the Missouri River, until a vast region—hitherto a sealed book to enterprise and science—has been reclaimed from the solitude of centuries, and forced to contribute from its long-locked treasures to the material elements of the world's prosperity. The great central region of our continent is no longer veiled in mystery. The pioneer and settler have penetrated this wilderness, discovered its wonderful natural resources, and forced it to succumb to the magical touch of science and industry.

The resources of this vast region are as varied as they are abundant. All the precious metals, nearly every mineral known to science, precious stones, mineral and thermal springs possessing extraordinary curative properties, extensive forests of timber suitable for lumber

Description of Colorado, by Mr. Bliss.

and fuel, and a soil of great fertility are included in the characteristics of this wonderful territory. To these may be added a climate of remarkable salubrity and healthfulness, a bracing atmosphere free from malarious influences, and a grand combination of natural picturesqueness, grandeur, and beauty found nowhere else on the face of the earth. It is not strange that such superior advantages should have attracted the attention and inspired the efforts of those who had grown restless under the restraints and perplexities of the more populous sections. And so, for a series of years, we find this remote region steadily emerging from its primeval solitude, and rapidly assuming the duties and dignities of an advancing civilisation.

THE SAN LUIS PARK.

Description of San Luis Park, by Mr. Bliss.

Combining in a superior degree all the natural advantages and resources just enumerated, and bountifully favoured in all the latent elements of profitable improvement, the "San Luis Park," lying in the southern part of Colorado Territory, has recently become an attractive field for the prospector and explorer. The San Luis is the southernmost one of the grand system of parks which so beautifully break the monotony of the Rocky Mountain range, and is the largest of them all. It has also the advantage of latitudinal position, a more fertile soil, and is in many other respects better adapted to successful development than either of the others. This park is easily accessible from the north through the Poncho Pass, and from the east by the Sangre de Cristo Pass, both of which are readily crossed with loaded waggons at all seasons of the year.

The streams which irrigate and drain this vast interior basin are numerous and abundant in volume. Near the centre of the park is the Sahwatch, or San Luis Lake, a body of water some 60 miles in extent, into which flow nineteen streams. This lake has no visible outlet, but is supposed to discharge its surplus water through subterranean channels. Further south the Rio Grande River bisects the park, running through its centre in almost a due south course. This river has numerous tributaries flowing from the Cordilleras on the east, and the Sierra Miembres on the west. These streams are flanked by beautiful bottoms, varying from one to ten miles in width, the soil of which is of great depth and extraordinary fertility. Overlooking these bottoms are extensive *mesas* or tables, covered with nutritious grasses, affording abundant pastorage for countless flocks and herds.

Geologically the San Luis Park is a perfect cabinet. The following is copied from a recent report of the Commissioner of the General Land Office:—"*From the primary rocks "outcropping at the mural summits to the sedimentary drift, covered with soil and varnished with "vegetation around San Luis (Sahwatch) Lake, all the elements of the geological series seem to be "represented. The crevices of the secondary rocks on the mountain sides are charged with richest "ores, the source of the golden detritus found in the gulches below.*"

Description of San Luis Park, by Mr. Bliss.

THE SANGRE DE CRISTO GRANT.

This Grant is situate in the southern portion of the San Luis Park, and embraces an area of upwards of 1,000,000 acres, divided into bottom land, second bottom, foot hills, and mountains. This vast estate possesses all the favourable characteristics of an agricultural, pastoral, and mining region. Its genial climate, its health-invigorating atmosphere, and equable temperature make it a most desirable district for settlement and residence. Scientific gentlemen and tourists who have passed over it pronounce the Sangre de Cristo Grant one of the richest and most attractive sections they have ever visited. Its admirable diversity of surface features adapts it to every branch of agricultural industry, and its abundant water-power affords ample opportunity for such manufacturing enterprises as the development of the district might warrant.

Bliss's description of the Sangre de Cristo Grant.

TIMBER.—The supply of timber is abundant for all the requirements of fuel and building: the foothills are covered with the piñon, and the mountain sides are feathered to the snow line with yellow pine.

SOIL.—The quality of the bottom land is not surpassed even in the far-famed valley of the Mississippi. Nearly every portion of the plain land is susceptible of easy irrigation, and the yield of agricultural products, as illustrated in frequent instances, is prolific in quantity and excellent in quality. All the cereals produce bountifully, and garden vegetables grow to an enormous size without losing their delicacy or tenderness.

PASTURAGE.—The natural grazing lands of this estate are unsurpassed anywhere in the world. The grasses are wonderfully thrifty and nutritious, and not subject to the

Bliss's description of the Sangre de Cristo Grant.

decomposition and decay which in less favoured climates follow the ripening of this herbage. They readily cure standing, thus affording excellent fodder for animals throughout the winter, and rendering unnecessary the gathering and sheltering of hay for the winter's supply. Even in the upper portions of Colorado, several degrees north of the region we are describing, cattle are *pastured* all winter on these standing grasses. This peculiarity, it is believed, exists in no other region in the world. As a great grazing district the Sangre de Cristo Grant possesses extraordinary advantages, and already enterprises of this kind have there been most profitably conducted. It is satisfactorily demonstrable that cattle, sheep, and other stock can be raised on this grant more profitably and more successfully than even on the great plains of Texas, where flocks and herds are often fearfully decimated by violent wind and rain storms, and where disease sometimes carries off vast numbers. In the San Luis Park no such disasters as these have ever occurred. Here stock thrive and increase without other food or shelter than the natural resources of the estate afford and the services of herders to prevent cattle from roaming too far away. A stock-breeder now engaged on this grant has not lost a single head from disease in three years, and the annual increase of his flock has been 59 per cent.

MINERALS.—Careful exploration has shown that about one-half of the area of the Sangre de Cristo Grant is rich in minerals; gold-bearing quartz is abundant in the mountains, and in many of the river beds rich *"placers"** have been discovered. For many years the rude and unskilled labour of the Mexican population has produced liberal quantities of the precious metal; and no doubt exists of the immense profitableness of mining on this grant, when proper machinery and experienced miners are employed in developing the lodes and placers known to abound in this region. Ores of silver, copper, iron, and lead have also been found in liberal quantities, and the indications are numerous that all these minerals can be successfully and profitably mined. It may be safely asserted that the number and extent of "lodes" throughout the Sangre de Cristo Grant are sufficient to profitably employ many thousands of miners for an indefinite period.

The capability of a rich mining region to support a large population, and favourably affect a wide-spread commercial interest, is illustrated in the history of what is known as

* "*Placers*" consist of the beds of streams and mountain ravines in which gold is found in places, having been deposited by the washings from the mountains.

the "Gregory District," in Gilpin County, Colorado Territory. All the mines of this district are embraced within the limits of four miles square, and yet more than four-fifths of the entire gold product of Colorado has been obtained from this district. The population of Colorado, now estimated at 60,000, finds profitable employment in business enterprises connected with or growing out of the mining interests of Gilpin County. The amount of money necessary to meet all the business requirements of such a population is not less than $20,000,000 annually. Before the War of Rebellion the circulating medium of Colorado was in gold-dust or coin—a branch mint of the United States in Denver contributing largely to the latter. The power and influence of a rich mining region are clearly shown by this illustration.

Bliss's description of the Sangre de Cristo Grant.

Recent explorations and mining enterprises have disclosed even richer districts than the far-famed "Gregory," within the limits of the Sangre de Cristo Grant. Experienced practical miners, for years familiar with the character and capacity of the "Gregory" mines, have prospected the mining regions of the grant, and do not hesitate to say that it will more than rival the product of "Gregory," with far less expenditure of money in its development. Labour can be obtained on this grant for less than one-third the prevailing wages at "Gregory," and provisions at even more favourable rates.

ACCESSIBILITY.—The rapid extension westward of the Pacific Railway lines has already brought this estate within convenient distance of railway communication with all parts of the eastern States. Another twelvemonth will probably find permanent railway communication to within a few hours' travel of the grant, and projected roads have been surveyed, leading directly through the estate. This will afford a ready outlet for the products of this region, and attract at once the immigration which alone is needed to develop its dormant wealth. It will also cheapen the cost of mill machinery, engines, &c., the transportation of which by waggons for a distance of 600 miles from the Missouri River has been a serious obstacle to the development of this estate.

MARKETS.—The flourishing territories of Colorado on the north and New Mexico on the south will, to a considerable extent, become good markets for the surplus agricultural products of this vast estate; while the stock-raiser will always find a ready and profitable sale of his stock in the markets of the east. In this

Bliss's description of the Sangre de Cristo Grant.

connection it should be remembered that cattle can be driven throughout nine months of the year from this grant direct to the Missouri river, feeding and fattening at every halting place along the route. The cost of such transportation is too trifling to be estimated.

DESCRIPTION OF THE SAN LUIS PARK: BY THE HON. WILLIAM GILPIN, GOVERNOR OF COLORADO.

THE SAN LUIS PARK.

Description of San Luis Park, by Governor Gilpin.

THE San Luis Park is readily entered at the extreme north through the Poncho Pass, penetrating the Cordillera from the Arkansas River. This park, of elliptical form and immense dimensions, is enveloped between the Cordillera and Sierra Miembres. It has its extreme northern point between these two Sierras, where they separate by a sharp angle and diverge; the former to the south-east, the latter to the south-west. The latitude of the Poncho Pass is 38 degrees 30 minutes, the longitude 106 degrees. It is 125 miles south-west from Denver, and 37 miles due west from Cañon City.

Emerging from the Poncho Pass, the waters begin to gather and form the San Luis River. This flows to the south through a valley of great beauty, which rapidly widens to the right and left. On the east flank the Cordillera ascends abruptly and continuously, without any foot hills, to a sharp, snowy summit; on the west, foot hills and secondary mountains, rising one above the other, entangle the whole space to the Sierra Miembres.

The Sahwatch river has its source on the inner (eastern) flank of the Sierra Miembres, about 60 miles south of its angle of divergence from the Cordilleras, and by a course nearly

east converges towards the lower San Luis River. It enters upon the park by a similar valley. These two valleys expand into one another around this mass of foot hills, fusing into the open park, whose centre is here occupied by the San Luis Lake, into which the two rivers converge and discharge their waters.

Description of San Luis Park, by Governor Gilpin.

The San Luis Lake, extending south from the point of the foot hills, occupies the centre of the park for 60 miles, forming a bowl without any outlet to its waters. It is encircled by immense saturated savannas of luxuriant grass. Its water surface expands over this savanna during the season of the melting snows upon the Sierras and shrinks when the season of evaporation returns. From the flanks of the Cordillera on the east, at intervals of six or eight miles asunder, and at very equal distances, 14 streams, other than the San Luis, descend and converge into the San Luis Lake. The belt of sloping plain between the mountains and the lake, traversed by so many parallel streams, bordered by meadows and groves of cottonwood trees, has from this feature the name "Los Alamosos." It is 60 miles in length and 20 wide. On the opposite (western) side, from the flank of the Sierra Miembres, similar streams descend from the west into the lake known as the Sahwatch, the Carnero, and the Gareta.

The confluent streams thus converging into the San Luis Lake are 19 in number. The area thus occupied by this isolated lake and drained into it by its converging affluents, forming distinctly the northern section of the park, and being one-third of its whole surface, is classified under the general name of "Rincon."

Advancing onward to the south, along the west edge of the plains, 10 miles from the Gareta, the Rio del Norte issues from its mountain gorge. Its source is in the perpetual snows of the peaks of San Juan, the local name given to this stupendous culmination of the Sierra Miembres. The Del Norte flows from its extreme source due east 150 miles, and having reached the longitudinal middle of the park, turns abruptly south; and, bisecting the park for perhaps 150 miles, passes beyond its rim in its course to the Gulf of Mexico. All the streams descending from the enveloping Sierras (other than the Alamosos) converge into it their tributary waters. On the west come in successively the Pintada, the Rio del Gata, the Rio de la Gara, the Conejos, the San Antonio, and the Pieda. These streams, six or eight miles asunder, parallel, equidistant, fed by the snows of

Description of San Luis Park, by Governor Gilpin.

the Sierra Miembres, have abundant waters, very fertile areas of land, and are all of the very highest order of beauty.

Advancing again from the Rincon, at the eastern edge of the plain along the base of the Cordillera, the prodigious conical mass of the Sierra Blanca protrudes like a vast hemisphere into the plain and blocks the vision to the direct south. The road describes the arc of a semi-circle around its base for 30 miles, and reaches Fort Garland.

In the immediate vicinity of Fort Garland, the three large streams, the Yuta, Sangre de Cristo, and the Trenchara, descend from the Cordillera, converge, unite a few miles west, and, blending themselves in the Trenchara, flow west 24 miles into the Rio del Norte. The line of the snowy Cordillera, hidden behind the bulk of the Sierra Blanca, here again reveals itself, pursuing its regular south-south-east course and direction. 14 miles south is reached the town of San Luis, upon the Culebra river; 17 miles further is the town of Costilla, upon the Costilla river; 15 miles further the town of Rito Colorado is reached; 18 miles onward is the Arroyo Hondo; (between these is the San Cristoval;) from the Arroyo Hondo to Taos is 14 miles, 20 miles beyond Taos is the mountain chain whose circle toward the west forms the southern mountain barrier which encloses the San Luis Park in that direction.

The San Luis Park is then an immense elliptical bowl, the bed of a primeval sea which has been drained; its bottom, smooth as a water surface and concave, is 9400 square miles in area. It is watered by 35 mountain streams, which, descending from the encircling crest of snow, converge, 19 into the San Luis Lake, the rest into the Rio del Norte. An extraordinary symmetry of configuration is its prominent feature. The scenery, everywhere sublime, has the ever-changing variety of the kaleidoscope. Entirely around the edge of the plain, and closing the junction of the plain with the mountain foot, runs a smooth glacis, exactly resembling the sea beach which accompanies the conjunction of the land with the ocean. From this beach rise continuously all around the horizon the great mountains, elevating their heads above the line of perpetual snow. On the eastern side the escarpment of the Cordillera rises rapidly, and is abrupt; on the western side the crest of the Sierra Miembres is more remote, having the interval filled with ridges, lessening in altitude as they descend to the plain of the park. This continuous shelving flank of the Sierras, completing a perfect amphitheatre, has a superficial area equal to that of the level plain which it

envelopes, and gives to the whole enclosure within the encircling band of snow an area of 18,000 square miles. At an elevation of five or six thousand feet above the plain a level line upon the mountain wall marks the cessation of arborescence, above which naked granite and snow alone are seen. To one who ascends to this elevation at any point, the whole interior of this prodigious amphitheatre is scanned by the eye and swept in at a single glance. Aided by a glass, the smallest objects scattered over the immense elliptical area beneath are discernible through the limpid, brilliant, and translucent atmosphere. Two facts impress themselves upon the senses; the perfect symmetry of configuration in nature and the intense variety in the forms and splendour of the landscape. The colours of the sky and atmosphere are intensely vivid and gorgeous, the dissolving tints of light and shade are for ever interchanging; they are as infinite as are the altering angles of the solar rays in his diurnal circuit. Description of San Luis Park, by Governor Gilpin.

The average elevation of the plain above the sea level is 6400 feet. The highest peaks have an altitude of 16,000 feet above the sea. In the serrated rim of the park, as seen from the plain, projected against the canopy, are discernible 17 peaks, at very equal distance one from another. Each one differs from all the rest in some peculiarity of shape and position. Each one identifies itself by some striking beauty. From the snows of each one descends some considerable river, as well within the park as outward down the external mountain bank.

We recognise, therefore, in the San Luis Park an immense elliptical basin enveloping the sources of the Rio del Norte. It is isolated in the heart of the continent 1200 miles from any sea. It is mortised, as it were, into the midst of the vast mountain bulk, where, rising gradually from the oceans, the highest altitude and amplitude of the continent is attained. This park spreads its plain from 36 to 38 deg. 30 min., and is bisected by the 106th meridian. Its greatest length is 210 miles; its greatest width is 100; its aggregate approximate area is 18,000 square miles.

The American people have heretofore developed their social system exclusively on the borders of the two oceans, and within the maritime valleys of moderate altitude, having navigation and an atmosphere influenced by the sea. To them, then, the contrast is complete in every feature, in these high and remote altitudes beyond all influence of the ocean, and specially continental.

Description of San Luis Park, by Governor Gilpin.

There is an identity between the "Valley or Park of the City of Mexico" and the San Luis Park which ought to be here mentioned. They are similar, twin basins of the great plateau, classifying together and alike in the physical structure of the continent. Mexico is in latitude 20 degrees, longitude 99 degrees, and at 7500 feet altitude. The width of the continent is here 575 miles (from ocean to ocean), and the divergence of the Cordilleras is 275 miles, which is here the width of the plateau. At the 39th degree the continent expands to a width of 8500 miles between the oceans; the Cordilleras have diverged 1200 miles asunder, and the plateau has widened to the same dimensions. In harmony with this great expansion of the continent are all the details of its interior structure. The "Park of the City of Mexico" is but one-tenth in size and grandeur as compared and contrasted with the San Luis Park. Of identical anatomy — the former is a pigmy, the latter a giant. The similitude as component parts of the mountain anatomy is in all respects absolute, as is also true of the other parks, which occupy longitudinally the centre of the State of Colorado.

METEOROLOGY.—The atmospheric condition of the San Luis Park, like its scenery, is one of constant brilliancy, both by day and night, obeying steady laws, yet alternating with a kind of playfully methodical fickleness. There are no prolonged vernal or autumnal seasons. Summer and winter divide the year. Both are characterised by mildness of temperature. After the autumnal equinox the snows begin to accumulate upon the mountains. After the vernal equinox they dissolve. The formation of light clouds upon the crest of the Sierras is incessant. The meridian sun retains its vitalising heat around the year; at midnight prevails a corresponding tonic coolness. The clouds are wafted away by the steady atmospheric currents coming from the west. They rarely interrupt the sunshine, but, refracting his rays, imbue the canopy with a shining silver light at once intense and brilliant. The atmosphere and climate are essentially continental, being uninterruptedly salubrious, brilliant, and tonic. The flanks of the great mountains, bathed by the embrace of these irrigating clouds, are clad with dense forests of pine, fir, spruce, hemlock, aspen, oak, cedar, piñon, and a variety of smaller fruit trees and shrubs, which protect the sources of springs and running rivulets. Among the forests alternate mountain meadows of luxuriant and nutritious grasses. The ascending clouds, rarely condensed, furnish little irrigation at the depressed elevation of the plains, which are destitute of timber, but clothed in grass. These delicate grasses, growing rapidly during the annual melting of the snows, cure into hay as

the aridity of the atmosphere returns. They form perennial pastures, and supply the winter food of the aboriginal cattle, everywhere indigenous and abundant.

Description of San Luis Park, by Governor Gilpin.

An infinite variety in temper and temperature is suggested as flowing from close juxtaposition of extreme altitudes and depressions; permanent snows, running rivers, and the concentric courses of the mountains and rivers. Storms of rain and wind are neither frequent nor lasting. The air is uniformly dry, having a racy freshness and exhilarating taste. A soothing serenity is the prevailing impression upon those who live perpetually exposed to the seasons. Mud is never anywhere or at any time seen. Moderation and concord appear to result from the presence and contact of elements so various.

The critical conclusions to which a rigid study of nature brings the scrutinising mind are the reverse of first impressions. The multitudinous variety of nature adjusts itself with a delicate harmony which brings into healthy action all the industrial energies. There is no use for the practice of professional pharmacy. Chronic health and longevity characterise animal life. The envelope of cloud-compelling peaks, the seclusion from the oceans, the rarity of the air inhaled, and the absence of humidity disinfect the earth, the water, and the atmosphere of exhalations and miasmas. All of these are banished, as it were, by the perpetual brilliancy and salubrity of the atmosphere and landscape, whose unfailing beauty and tonic taste stimulate and invite the physical and mental energies to perpetual activity.

GEOLOGY AND MINERALS.—As a geological basin, the San Luis Park is in the highest degree interesting and remarkable. It is found to contain, intermingled and in order, a complete epitome of all the elements of which geological science and research take note. Its intra-mural locality between the primeval crests of the Cordillera on the east, and the Sierra Miembres (here called the "San Juan") on the west, multiplies this variety indefinitely. These primary Sierras, separated by the park, face one another in full sight, as they rear their flanks from the opposite edges of the concave plain. The successive periods and stupendous forces which have expended themselves to produce what is in sight, and then subsided to an eternal rest, each particularly manifests itself. The comb of the Sierra presents the prodigious plates of primeval

Description of San Luis Park, by Governor Gilpin.

porphyry driven up, as the subsoil of a furrow, from the lowest terrestrial crust and protruding their vertical edges toward the sky.

This summit, yielding to the corroding forces, presents a wedge toward the canopy; is arranged in peaks resembling the teeth of a saw; is above all arborescence, and is either clad in perpetual snow or is bald rock.

Against this is lapped perpendicularly the second stratum, less by many thousand feet in altitude, its top forming a brim or bench. This bench, being the rended edge of the erupted stratum, softer than the first, and receiving the debris from above, has a deep, fertile soil, a luxuriant alpine vegetation, forests of fir and aspen, and is the highest region of arborescence and vegetable growth.

This is the region of rocks where the metals, especially gold and silver, abound in crevices charged and infused with the richest ores. It is from hence that the gold of the gulches is disintegrated and descends. Here are springs of water and the sources of rivers. The timber is excellent, and the pastures of various grasses luxuriant and inexhaustible. Swept by ascending currents of vapour, irrigation is constant. This elevated bench is a permanent characteristic of the mountain flank, continuous as the continent itself; a colossal staircase whose steps are themselves of mountain magnitude. It is here, at these surfaces of contact of the erupted plates of the lowest terrestrial crust that the thread of the "gold belt" is revealed and found. From this thread, as from a core outward, the precious metals taper in quantity and become diluted in the immensity of the rocks, as a hill of rock salt disappears to the eye, dissolved in the immensity of the ocean.

The top of this continuous bench is undulating, broad, and occasionally crossed by transverse ridges and the chasms of watercourses. The front flank of this bench forms the stupendous escarpment of the mountains, everywhere lofty and precipitous. It is cut through by innumerable streams, up whose gorges access to the upper regions is attained, and the internal contents—the intestines, as it were, of the rocks—are revealed to sight and search.

Forming the pediment of this stupendous mural escarpment is the second brim or bench (being the lowest) in the general mountain descent. Here the approaching elevation

Description of San Luis Park, by Governor Gilpin.

of the plain, the increase in size of the streams, the accumulating debris from above, and the increased atmospheric abrasion, all unite to obliterate the angularity of the rocks and impair the striking distinctness of formation. Forests of pine and deciduous trees prevail. The flora and vegetation are abundant and various. The atmospheric irrigation becomes uncertain, and the rocks are covered with soil or the fragments of their own superficial destruction. Immediately following is the broad space occupied by the fusion of the mountain base and the plain gently descending to meet it. Here is a profile infinitely indented and broken; alternately the sloping ridges protrude their ribs into the plain, and the plain advances its valleys between them to receive the streams. This is the region of the placers, where is checked in its descent and lodged beneath the alluvial soil the free gold washed down by torrents from the overhanging summits.

This sketch of the normal structure and configuration of the Cordillera is illustrated by a chequered list of details in its minute elements. The primeval rocks, heated to incandescence, rest in their vertical positions unaltered from their original form; they have been roasted but not liquefied. Original strata of limestone and gypsum, uplifted on high but not destroyed, rest upon the summit as a torn hat. Gypsum, limestones, slates, clays, shales are thus found near the summits. The decay of the secondary rocks gives extraordinary fertility to the mountain flanks and to the alluvial bottoms below. Hence the luxuriance of the arborescence, the pastures, and the flora. The altitude of the summits gathers and retains the snows, whose glaciers give birth to innumerable rivers. These gash the precipitous flanks with chasms, up which roads ascend; the composition of the rocks is here revealed; the mysteries of their interior contents are unravelled, and the secretions of nature subjected to the human eye and hand.

Thus, then, erects itself the primeval Cordillera, constructed of horizontal plates, vertically thrown up by stupendous volcanic forces, partially altered or roasted by incandescent heat, but neither destroyed nor re-cast in form; the secondary rocks are tossed and scattered high in the upper regions, but are not calcined by flame. The metallic ores are as various as is the variety of the rocks, enriched by heat and exposed by upheaval and corrosion. No lava, no pumice, no obsidian, nothing of melted matter from the plutonic region is seen. This furrowing of the terrestrial crust has alone occupied and exhausted the stupendous volcanic throes of the subterranean world of fire.

SIERRA MIEMBRES.

Description by Governor Gilpin.

The Sierra Miembres, forming the western envelope of the park, is not dissimilar to the Cordillera in its origin, composition, and configuration. Rising from the level of the great plateau, it is of inferior bulk and rank. It forms the backbone from whose contrasted flanks descend the waters of the Rio del Norte on the east, and of the Colorado on the west.

Craters of extinct volcanoes are numerous; streams of lava, once liquid, abound; pedrigals of semi-crystalline basalt submerge and cover the valleys into which they have flowed, and over which they have hardened.

This Sierra, then, has a general direction from north to south, corresponding with the 109th meridian. It has all the characteristics in miniature of the Cordillera, but is chequered and interrupted by the escape of subterranean fires, having areas overflowed and buried beneath the erupted current. Where the nascent springs of the Rio del Norte have their birth the Sierra Miembres culminate to stupendous peaks of perennial snow, locally named Sierra San Juan.

The concave plain of the San Luis Park, begirt by this elliptical zone of the Sierras, thus capped with a ragged fringe of snow projected upward against the canopy, is the receptacle of their converging waters. It is a bowl of vast amplitude, which has for countless ages received and kept the sedimentary settlings of so prodigious a circuit of Sierras, built up with every variety of form, structure, and geological elements elsewhere found to enter into the architecture of nature. Hither descend the currents of water, of the atmosphere, of lava. The rocks rent from the naked pinnacles, tortured by the intense vicissitudes which assail them; the fragments rolled by the perpetual pressure of gravity upon the descending slopes; the sands and soils from the foundations of rocks and clays of every gradation of hardness; the humus of expired forests and annual vegetation; elements carbonised by transient fires; organic decay,—all these elements descend, intermingle, and accumulate.

This concave plain is, then, a bowl filled with sedimentary drift, covered with soil and varnished over as it were with vegetation. The northern department or Rincon, closely embraced by the Sierras and occupied by the San Luis Lake, is a vast savannah deposited

from the filtration of the waters, highly impregnated with the mountain debris. Beneath this soil is a continuous pavement of peat, which maintains the saturation of the super-soil, and is admirable for fuel. Description by Governor Gilpin.

The middle region of the plain, longitudinally, displays a crater of the most perfect form. The interior pit has a diameter of twenty miles, from the centre of which is seen the circumferent wall, forming an exact circle, and in height five hundred feet. This wall is a barranca, composed of lava, pumice, calcined lime, metamorphosed sandstone, vitrified rocks, and obsidian. This circumferent barranca is perforated through by the entrance and departure of the Rio del Norte, the Culebra, and the Costilla rivers, which traverse the northern, western, and southern edges of the interior. By this and other forces of corrosion this barranca is on these three sides cut into isolated hills, called cerritos, of every fantastic form and of extraordinary beauty of shape and tints. The bottom of the crater has been filled up with the soils resulting from the decay of this variety of material, introduced by the currents of the water and of the atmosphere. It is bevelled by these forces to a perfect level, is of the fattest fertility, and drained through the porous formation which underlies it.

From this crater to its southern rim, a distance of sixty-five miles, the park expands over a prodigious pedrigal formed from it in the period of volcanic activity. This pedrigal retains its level, and is perforated by the Rio del Norte, whose longitudinal course is confined in a profound chasm or cañon of perpendicular walls of lava, increasing to the depth of 1200 feet, where it debouches from the jaws of this gigantic flood of lava near the village of La Hoya, in New Mexico. Such are the extraordinary forms and stupendous dimensions with which nature here salutes the eye and astonishes the imagination. The expansion of the lava is all to the south, following the descent toward the sea. Toward the north, repelled by the ascent, are waves demonstrating the defeated effort to climb the mountain base.

Such is an imperfect sketch of this wonderful amphitheatre of the Sierras. Its physical structure, infinitely complex, exhibiting all the elements of nature piled in contact, yet set together in order and arranged in harmony; its cloud-compelling Sierras, of stern primeval matter and proportions; its concave basin of fat fertility; its atmosphere of dazzling brilliancy, tonic temperature, and gorgeous tints; its arable and pastoral excellence, grand forests, and multitude of streams; its infinite variety of mines and minerals, embracing the whole catalogue of metals, rocks, clays, and fuel; its capacity to produce grain, flax, wool,

Description by Governor Gilpin.

hides, vegetables, fruits, meats, poultry, and dairy food; the compact economy of arrangement which blends and interfuses all these varieties; these combine to provoke, stimulate, and reward the taste for physical and mental labour.

Entrance and exit over the rim of the park is everywhere made easy by convenient passes. Roads re-enter upon it from all points of the compass and every portion of the surrounding continent. These are not obstructed at any season. On the north is the Poncho Pass, leading to the Upper Arkansas River and into the South Park. On the east, the Mosco and Sangre de Cristo Passes debouch immediately upon the Great Plains. On the south is the channel of the Rio del Norte. On the west easy roads diverge to the Rivers Chamas, San Juan, and toward Arizona. In the north-west the Cocha-to-pee opens to the great Salt Lake and the Pacific. Convenient thoroughfares and excellent roads converge from all points and diverge with the same facility.

The system of the four parks, extending to the north, indefinitely amplifies and repeats all that characterises the San Luis Park. Smaller in size and less illustrated by variety, each one of the three by itself lingers behind the San Luis, but is an equal ornament in the same family. Their graceful forms, their happy harmony of contact and position, make their aggregated attractions the fascinating charm and glory of the American continent.

The abundance and variety of hot springs of every modulation of temperature is very great. These are also equalled by waters of medicinal virtues. It has been the paradise of the aboriginal stock, everywhere so abundant and various. Fish, waterfowl, and birds of game and song and brilliant plumage frequent the streams and groves. Animal life is infinite in quantity and abundantly various.

The atmospheric currents, which sweep away every exhalation and all traces of malaria and miasma, have an undeviating rotation. These currents are necessarily vertical in direction and equable in force, alternating smoothly as land and sea currents of the tropical islands of the ocean. The silence and serenity of the atmosphere are not ruffled; the changing temperature alone indicates the motion of nature.

All around the elliptical circumference of the plain, following as it were its shore, and bending with the indented base of the mountain, is an uninterrupted road of unparalleled

excellence. This circuit is 500 miles in length, and is graced with a landscape of uninterrupted grandeur, variety, and beauty; on the one hand the mountains, on the other hand the concave plain, diversified with groves of alamos and volcanic cerritos. At short intervals of five or ten miles asunder are crossed the swift-running currents and fertile meadows of the converging mountain streams. Hot springs mingle their warm water with all these streams, which swarm with delicate fish and waterfowl. Description by Governor Gilpin.

The works of the beaver and otter are everywhere encountered, and water-power for machinery is of singularly universal distribution. Agriculture classifies itself into pastoral and arable; the former subsisting on the perennial grasses, the latter upon irrigation everywhere attained by the streams and artificial *acequias*.* This concave configuration and symmetry of structure is remarkably propitious to economy of labour and production, favoured by the juxtaposition and variety of material, by the short and easy transport, and by the benignant atmosphere. The supreme excellence of position, structure, and productions thus grouped within the system of the parks of Colorado, occupying the heart of the continental home of the American people, is conclusively discernible. Here is the focus of the mountains, of the great rivers, and of the metals of the continent. The great rivers have here their extreme sources, which interlock and form innumerable and convenient passes from sea to sea. From these they descend smoothly to both oceans by continuous gradations. The parks occupy the line of the fortieth degree, and offer the facilities for a lodgment in force, at the highest altitude, where the supreme divide of the continent exists, half-way between the trough of the Mississippi and the Pacific shore. Being immediately approachable over the Great Plains, their mines of precious metals are the nearest in the world to the social masses of the American people and to their great commercial cities. Their accessibility is perfect. All the elements of a perfect economy—food, health, geographical position, innumerable mines of the richest ores and every variety—erect, assist, and fortify one another.

The San Luis Park has 24,000 population. These people are the Mexico-American race. Since the conquest of Cortez, A.D. 1520, the Mexican people have acquired and adopted the language, religion, and, in modified forms, the political and social systems of their European rulers. A taste for seclusion has always characterised the aboriginal masses, heightened by the geographical configuration of their peculiar territory. Upon the plateau

* *Acequias*—canals for irrigation.

Description by Governor Gilpin.

elevated 7000 feet above the oceans, and encased with an uninterrupted barrier of snow, reside 9,000,000 of homogeneous people. An instinctive terror of the ocean, of the torrid heats and malarious atmosphere of the narrow coasts on either sea, perpetually haunts the natives of the plateau. To them navigation is unknown and maritime life is abhorrent. The industrial energies of the people, always active and elastic, and always recoiling from the sea, have expanded to the north, following the longitudinal direction of the plateau, of the mountains, and of the great rivers. This column of progress advances from south to north; it ascends the Rio Bravo del Norte; it has reached and permanently occupies the southern half of the San Luis Park.

At the same moment the column of the American people, advancing in force across the middle belt of the continent, from east to west, is solidly lodged upon the eastern flank of the Cordillera, and is everywhere entering the parks through its passes. These two American populations, all of the Christian faith, here meet front to front, harmonize, intermarry, and re-invigorate the blended mass with the peculiar domestic accomplishments of each other.

REPORT OF PROFESSOR F. V. HAYDEN, OF THE UNIVERSITY OF PENNSYLVANIA.

United States Geologist in the Territories of Wyoming and Colorado.

DEAR SIR, NEW YORK, *Dec.* 5, 1868.

Professor Hayden's Report.

In October last, while engaged in the performance of my duties as United States' Geologist, in the territories of Wyoming and Colorado, you requested me to proceed to the San Luis Park, in the southern part of Colorado, and examine the resources of a region which had attracted no little attention from tourists and explorers.

Four days' ride from Denver brought me to Fort Garland, a United States military post, located on the Sangre de Cristo Grant. The roads travelled over were firm and smooth, leading through a district remarkable for the grandeur and beauty of the scenery. All along the route are farming settlements, the fertile soil of the rich bottom lands yielding bountiful returns for well-directed agricultural efforts.

The road from the eastern slope to the San Luis Valley passes through what is known as the Sangre de Cristo Pass; and this forms the mail route to Fort Garland, and from thence down the San Luis Valley to Santa Fé, in New Mexico. All the supplies for the military post and for the inhabitants of the San Luis Valley are transported over this pass. This route has already been carefully surveyed by competent engineers connected with the Union Pacific Railroad, Eastern Division, and decided to be one of the practicable and probable routes of railway transit across the continent. I remained on the property about a fortnight, and made diligent use of all the means in my power to ascertain the resources of this interesting region, whilst every facility was afforded for my work. Professor Hayden's Report.

The Sangre de Cristo Grant is located in what is known as the San Luis Park, in the southern portion of the territory of Colorado. By reference to any general map of the country west of the Mississipi river, it will be seen that this park forms the southernmost one of the series, ranging north and south, called the "North," "Middle," "South," and "San Luis" Parks. The last-mentioned is by far the largest of the four, is oval in shape, with a length of 210 miles from north to south, and a breadth of 100 miles from east to west. The southern portion of the park is bisected by the Rio Grande del Norte for a distance of 150 miles. On the eastern side, rising like a gigantic wall, is the mountain range of the Sierra Madre, and on the west the San Juan mountains. These lofty ranges of mountains seem to converge at either end of the park, so as to form its peculiar and beautiful oval shape.

WATER.—These ranges of mountains on either side give birth to numerous streams, which intersect the plain country, and, converging, form important branches of the Rio Grande. A single glance at the map will reveal one of the most beautiful systems of drainage on this continent. It could not have been more perfectly adapted to the wants of an agricultural region if it had been arranged by the hand of art. The land embraced in the Sangre de Cristo Grant forms the eastern and southern portions of this valley, and is by far the finest agricultural district I have seen west of the Missouri river. The Rio Grande constitutes its western boundary for a distance of 42 miles, following the meanderings of that stream. Through the Grant flow three of the main branches of the Rio Grande: the *Trenchara*, *Culebra*, and *Costilla*. These are formed from numerous tributaries emerging from the mountains, which, converging at a considerable distance from the Rio Grande, form streams of sufficient size for all the purposes of irrigation or manufactures.

Professor Hayden's Report.

EXTENT OF GRANT.—The area covered by this grant is from 1,000,000 to 1,200,000 acres, divided into bottom land, upland terrace, the foothills of the mountains, and the true mountain portion. A careful estimate shows about 200,000 acres of bottom land, and 400,000 acres of upland, all of which may be rendered most productive by irrigation. The foothills of the mountains are densely covered with the piñon, a species of pine which forms the favourite article of fuel in this region. This pine bears a peculiar nut in the greatest abundance, which could be employed like the mast for fattening swine. Among these foothills are beautiful grassy valleys, so that the greater portion of the area occupied by them may be regarded as excellent pastoral land. Even the main mountain portion will prove a favourite resort in summer for all kinds of stock, but more especially sheep. The arable land of this grant, which I have estimated at about 600,000 acres, possesses all the elements of a wonderful fertility.

SOIL AND PRODUCTS.—The soil is composed of the eroded materials of igneous or basaltic rocks, the entire surface of the valley being underlaid with igneous rocks, and the foothills of the mountains, and even the main ranges themselves, being composed of them to a great extent. Now, it has long since been shown by Liebig and the most eminent agricultural chemists of the present time, that such soils are the most productive for cultivation, and this statement is borne out by universal experience. The productiveness of this region is illustrated by the results which follow even the rude cultivation in practice among the Mexican settlers. The soil yields from thirty to forty bushels of wheat per acre, fifty to sixty bushels of oats, and barley, buckwheat, and other cereals in proportion. A fair crop of Indian corn can be produced. The fruit of all kinds of cereals grows so full and plump that a measured bushel weighs several pounds more than the standard weight.

Nearly all kinds of roots grow with great luxuriance and perfection. Potatoes are produced in great abundance, and of unusual excellence. They are of remarkable size at times, not unfrequently weighing five to five and a half pounds a-piece. Beets could be raised in great quantities, for the manufacture of sugar.

STOCK.—As a stock-growing region, it is evident that this district could not be surpassed. The purity and dryness of the atmosphere, and the absence of deep snows, permit the rich grasses to dry up gradually in August, and retain all their nutritious matter; and cattle, horses, and sheep thrive all through the winter without special care. No hay is needed for winter

use. The valley is protected, as it were, by the proximity of the mountains, and the climate is quite mild and genial all winter, and most healthy for man and beast. Indeed, all kinds of live stock thrive so well that the losses by death or disease must ever be trifling in amount, so that they can hardly be taken into the estimate. It is believed that sheep will yield an annual income of 90 per cent.; cattle, 50 to 60 per cent. I am confident that the time is not far distant when some of the choicest stock on this continent will be raised in this valley. Professor Hayden's Report.

WATER.—The water is very fine, and quite equally distributed over the surface of the grant, so that it might all be divided into arable and pastoral land.

CLIMATE.—The climate of the San Luis valley is unsurpassed in salubrity. Few deaths occur from natural causes. At the military post, Fort Garland, the medical officer informed me that not an adult had died there from natural causes for a period of three years, though the fort had been garrisoned with from 100 to 500 men. No epidemics can ever visit this region, and the climate is most favourable for all diseases of the respiratory and digestive organs. The effect on all systems infected with malarial poisons seems to be wonderful, and no malarial diseases are known to originate in this country. Indeed, the poor man with his family, seeking to escape from the poisoned atmosphere of our large cities, or the malaria of our middle or western States, will at once find that greatest blessing of life—health—in the pure bracing air of these mountain valleys.

TIMBER.—Timber for fuel occurs in almost unlimited quantities in the San Luis Park, and especially within the boundaries of the Sangre de Cristo Grant. In the more elevated portions of the mountains there is an abundance of saw timber, yellow pine being most plentiful.

ROADS.—The natural roads in this district are not surpassed for their excellence in any part of the world. No portion of the American continent east of the Mississippi river can compare with this mountain region in the smoothness of the roads, and the ease with which they can be travelled.

MINES.—Perhaps the most important feature connected with the grant alluded to, and one which will influence its future prosperity even more than its agricultural and pastoral resources, is its METALLIC WEALTH. Along the entire eastern border there is a lofty

Professor Hayden's Report.

range of mountains, which seems to be charged with ores of gold, silver, copper, lead, and iron. Mines of great value have already been opened and wrought, with rich returns of gold. From a quite careful examination of the gulch and quartz mines about the sources of the Trenchara and Culebra rivers, and from the statements of some of the most experienced practical miners in Colorado, I am convinced that the surface ndications of gold and other precious metals in this district are more favourable than in any portion of the great West. The quartz lodes are unusually wide, and enclosed within well-defined walls, and the quartz itself seems to be of remarkable richness. All the resources for the successful working of either the gulch or quartz mines abound in the immediate vicinity. Water is everywhere abundant, and fuel occurs in great quantities, and is easy of access. It is probable that there is no district in the mineral regions of our country where the mines are so easily approached as on this grant. Fine carriage roads may be made with very little labour, leading directly into the mines; and the miner may labour all day in the mines, descending at night to his home at the foot of the mountains, with all the vegetable products necessary for his comfort growing around him. Indeed, so great a body of arable and pastoral land, of superior excellence, in such close proximity to a vast area of mining land, must render this region very attractive and immensely valuable at no distant period. The mineral resources alone of the Sangre de Cristo Grant would give employment to a vast mining population, while the arable and pastoral land would yield a most abundant supply for all their physical wants. When it is remembered that the government price of mineral land is $20 per acre, and that of this class there are not less than 500,000 acres within the limits of the grant, its great value will be at once apparent.

ADVANTAGES OF GRANT.—After a careful examination of the Sangre de Cristo Grant I am satisfied that it contains every element necessary to the support of a large population. Its fertile soil, its extensive pasturage, its abundant water-power, its inexhaustible mineral resources, and the salubrity of its climate, all combine to render it the most inviting and most promising district west of the Missouri river. Within the last fifteen years I have carefully explored Kansas, Nebraska, Dakota, Montana, Idaho, Wyoming, and Colorado, and I can affirm that I know of no region of the West more desirable for settlement than this just described, combining as it does all the elements of wealth and productiveness.

Yours truly,

To WM. BLACKMORE, Esq.

F. V. HAYDEN.

EXTRACT FROM THE REPORT ON THE SAN LUIS PARK, COLORADO TERRITORY: BY ALBINUS Z. SHELDEN, U.S. SURVEYOR.

IN physical features the San Luis Park is remarkable. Its altitude is about 6500 feet above the sea level. The plain is a drift soil abraded from the mountains, and deposited by the currents of water and atmosphere. The calcareous element predominates in the alluvial soil, mixed with silicious and plutonic debris. These elements, mixed by the action of the water and winds, present to arable and pastoral life a smooth surface for culture, and perfect intrinsic fertility. Shelden's Report.

Here is recognised an atmosphere and climate purely continental. Situate most remote from the sea, and of mountain elevation, the atmosphere is entirely tonic, salubrious, and brilliant. Summer and winter divide the year, scarcely interrupted by vernal or autumnal seasons. The meridian sun retains its vitalising heat around the year; at midnight prevails a corresponding tonic coolness. The flanks of the mountains are clad with dense forests of pine, fir, spruce, and aspen; with these forests alternate mountain meadows of luxurious and nutritious grasses. These grasses, growing rapidly during the annual melting of the snows, cure into hay as the aridity of the atmosphere returns. They form perennial pastures, and supply winter food for the aboriginal cattle, everywhere indigenous and abundant. In pastoral agriculture there is seen the spontaneous production by nature of meat, dairy food, leather, wool, and kindred elements sustained as fish in the sea.

For arable agriculture, the area is equally ample in proportion, and of equally propitious excellence. All the cereals and fruits known to the European people acclimate themselves with the same facility as the people themselves and the animals that accompany them.

REPORT OF BARON EGGOLFSTEIN, AN ENGINEER FOR MANY YEARS OFFICIALLY CONNECTED WITH THE U.S. GOVERNMENT.

Baron Eggolfstein's Report.

My knowledge of the Park of San Luis is based upon critical surveys made by me when officially connected with the exploration of Fremont, Beckville, Macomb, and Ives.

All the topographical and other illustrations contained in the Congressional volumes, embodying the result of their expeditions, have been made by me "upon the ground," and the publications under my superintendence. When upon the Sangre de Cristo Grant in 1855, my explorations extended to the mountains. Here the extraordinary development of the minerals, especially of the gold-bearing quartz, due to convenience of access, incidental to the compact structure of the Cordillera, between the Great Plains (on the east) and the valley of San Luis Park (on the west) especially aroused and concentrated my attention. The richest gold-bearing quartz was recognised by me in immense masses, cropping out upon the flanks of streams near their sources; dense forests, abundance of rivers, pastoral and arable lands, and wild animals, are all here, of great excellence. Water-power is very generally distributed, and the atmosphere and scenery are of the most salubrious and attractive temperature and beauty. Whilst prosecuting my surveys in the Sierras flanking the San Luis Park on the east, I discovered in one locality a very rich gold vein. I was satisfied at the time, on identifying the gold-bearing masses of quartz, and the numerous placers on the descending streams, that the mountains abound in gold.

I have learnt that more recent and critical examinations have developed a number of gold mines on the Sangre de Cristo Grant, which fully accords with my anticipations and judgment of what would result from the repeated researches following my own preliminary examination.

(Signed) F. V. W. EGGOLFSTEIN.

NEW YORK, *June 3rd*, 1865.

EXTRACT FROM LETTER WRITTEN BY PROFESSOR EDWARD N. KENT, OF THE NEW YORK ASSAY OFFICE.

Extract from Letter of Prof Kent.

GOLD-MINING is generally conducted by those who have not been educated to the business, and it frequently happens that those who are the most successful become so by accident. With the application of science and suitable machinery, almost any of the lodes could be profitably worked. The prevailing error now seems to be, that success depends more upon the amount of quartz crushed than upon the amount of gold which can be saved from that which has been already crushed and is now lying dormant for want of suitable means to extract the gold.

During my stay in Colorado I made several assays of mill products, *the results of which appeared to be almost incredible.* I have, therefore, repeated the assays since my return upon twenty-five different samples, which I brought home with me. These assays have corroborated those made before (under rather unfavourable circumstances, incident to a new country), and I have found the average value of the mill products, as now made, to be as follows:—

Tailings . .	$34 74 per ton of 2000 lbs.
Blanketings .	$86 84 ,,
Pannings . .	$ 3 31 per lb., avoirdupois.

As to the extent of the gold mines of Colorado, I am not prepared to give an estimate, as I found enough to fully employ my time within a radius of five miles of Central City, Gilpin County; but as to the richness of them, *I have no hesitation in saying that I believe them to be the richest ever discovered.* With science, capital, and a Pacific railroad, Colorado *is destined, in my opinion, to rival or supersede California and Australia, and become the El Dorado of the West.*

REPORT OF CAPTAIN JAMES ABORN, LATE MANAGER OF THE NARRAGOMSET MINING COMPANY'S WORKS IN GILPIN COUNTY, COLORADO.

PROVIDENCE, R.I., *Jan.* 11, 1865.

Hon. WM. GILPIN,

Capt. Aborn's Report.

As requested by you, I submit the following description of my trip to the "Sangre de Cristo" Grant.

I secured the services of ten of the most experienced and successful prospectors in the territory of Colorado; and with them, in fifty-two days, discovered twenty-two "lodes" and two "placers."

In the time expended in prospecting, many days were passed in opening the lodes to a well-defined crevice; the mere location of the lode requiring but a few hours. We never failed to find lodes in abundance, wherever we sank for them, after examining the locality and surface indication.

It is my opinion, and the opinion of every one of the men employed, that the lodes and gulches are fully as rich as any of the mines in "Gregory" district. The crevices are wider and more fully and strongly defined. Pyrites of iron crop out of the surface, frequently in veins eight or nine feet wide. Mines can be worked here much cheaper than in Gregory district, owing to their accessibility and all the materials requisite being close at hand. Water-power is abundant—wood and timber plenty. Farming lands of superior quality are close at hand. Labour is plenty at about three shillings per day, and the cost of living small. I have no doubt but mills could be started and yield handsome returns on any capital properly invested. I think that the tract included in this grant will be found to be unsurpassed as an agricultural, mineral, and pastoral country, and from either of these sources large profits may be obtained, the extent to which they can be developed being almost unlimited.

Respectfully,

(Signed) JAMES ABORN.

LETTER OF A. A. BRADFORD, DELEGATE TO THE U.S. CONGRESS.

Hon. W. GILPIN, WASHINGTON, *June 1st*, 1865.

DEAR SIR,

Previous to my election as Congressional Delegate from Colorado, and when Associate Justice of the Supreme Court, I visited the county seat of Costilla County (the town of St. Luis de Culebra) where I held a semi-annual term of the U.S. Court. I have traversed the Sangre de Cristo Grant on each occasion, and testify to its great value, high state of development, and richness in mines of the precious metals. Mr. Bradford's Report.

During the October term of 1864, I visited the gold mines at the base of the Culebra Peak, six miles east of the Culebra, accompanied by Messrs. Stone, Hinsdale, and Gaspar, all familiar with the mines of Colorado territory. We found numerous veins of gold-bearing quartz, which we examined and found very rich. I learned, in conversation with the resident people, of numerous rich placers having been successfully worked. Information gathered by me in conversation with the people satisfies me of the existence of gold mines, scattered throughout the mountains, which are high and very precipitous. I remarked the extraordinary ease of access to the summit of the Sierra, everywhere upon the grant, especially at Culebra, which is only thirteen miles from the highest crest.

I met, on one occasion, with Captain James Aborn, and the party of miners accompanying him. I fully accord with them in all their statements of the abundance and richness of the mines of precious metals, some of which I have seen and examined.

Of water-power and its distribution and convenience, there is abundance.

The population employs itself exclusively in pastoral and arable agriculture, which is on a very extensive scale and of great excellence.

I learned that stock to the amount of 50,000 head were owned by the people on the grant.

Mr. Bradford's Report.

From surplus products large amounts have been furnished to the United States army and the mines of Colorado. Labour is abundant and cheap among a population estimated by me at from 4000 to 6000* in the aggregate. The whole area of the grant is very valuable for its pastoral excellence.

The streams are numerous, and generous in their supply of water; the forests suited for lumber and are ample in quantity. The farming lands are of superior quality. The climate is salubrious and very propitious for uninterrupted labour. Besides the number and richness of the mines of gold, they are easy of access, and better situated for economic and profitable labour than any with which I have been acquainted elsewhere.

(Signed) ALLEN A. BRADFORD,
Delegate to the 39th Congress.

BISHOP SIMPSON.

Extract from Letter of Bishop Simpson.

THE well-known Bishop Simpson travelled through Colorado in the year 1862.

The following extract from one of his letters is taken from the *Christian Advocate* of February 28th, 1863.

"Even in the mountains very fine vegetables have been produced at an elevation "of 9000 feet above the level of the sea.

"The pasturage of the plains and mountains is remarkable. The grasses are very "nutritious, and they cure standing. Cattle refuse to eat hay in the winter when they "can have access to the dry grass of the plains.

"Beef cattle that have not been fed a pound of grain or hay are very frequently "brought to market, even in winter. The climate is mild and healthful. For nine "months in the year, from October to July, little or no rain falls, and even in summer there "are few heavy rains, and none of long duration.

* This must indicate the entire population of Costilla County.

Extract from Letter of Bishop Simpson.

"The streams are fed by the snows on the mountains. In summer the heat on "the plains is at times intense during the day, yet the nights are invariably cool. In "the mountains the temperature is lower, and less liable to extremes.

"Flourishing villages may be found at an elevation of nine and even eleven "thousand feet above the level of the ocean.

"In the mountains during the months of July, August, and a portion of September, "light showers fall nearly every day—generally in the afternoon, caused probably by the "evaporation, from the mountains, of snow.

"Frequently these showers do not reach the plains. On the plains buffalo, antelope, "and hare are abundant. In the mountains are found grizzly and cinnamon bears, "mountain sheep, bison, elk, and other game. Silver, copper, cinnabar, galena, "plumbago, antimony, coal, and salt abound, but none of these mines have been "extensively worked, in consequence of the want of capital and the general tendency "to gold-mining. Precious stones have also been found, such as opal, agate, amethyst, "emerald, &c. Some beautiful moss agates have been picked up in the Middle Park. "The streams abound in trout of delicious flavour.

* * * * * * * *

"Until very recently all the capital used in developing these mines was first obtained "from them.

"The people who emigrated there were generally poor. To carry on lode-mining "requires capital. Supplies of all kinds are high. Although there are, perhaps, no richer "mines in America than those of Colorado, no man of limited means should attempt their "development. A man or company with fifty thousand dollars would be almost certain of "realising immense profits."

BISHOP KINGSLEY,

Bishop Kingsley's Letter.

In a letter to the Western *Christian Advocate*, says of the scenery of Colorado :—

"The scenery in this country is the grandest that can be conceived of. From Denver "the view is particularly beautiful. On the south-east, at the distance of seventy miles, and "at the north-west, at perhaps the same distance, stand two noted mountains; the former "is Pike's Peak, and the latter Long's Peak.

"These mountains lift their snowy heads into the heavens about three miles high, "and a circular range of snow-covered mountains reaches from one of these vast spurs "to the other, the whole forming a tremendous amphitheatre, whose diameter is one "hundred and fifty miles. The sight in the morning, as the light of the rising sun "falls on their lofty ranges, is most charming.

"The sunset views, and also the sights by moonlight, are exceedingly beautiful.

"There never was a finer field for the display of the painter's talent. There is a "remarkable fact, to which I do not recollect to have seen attention called—namely, "that vegetable and animal life have become acclimated to their mountain temperatures, "so that both flourish with a degree of temperature which would prove almost fatal in "other parts of the country.

"I saw strawberries in bloom at an altitude of two miles. Raspberries flourish "in great abundance at this same altitude. It often happens, as I was assured again "and again in the mountains, that ripe raspberries and strawberries can be taken with one "hand and snow with the other.

"Many of the most delicate and beautiful flowers come right up through the snow."

LETTER FROM MAJOR WHITSETT, ONE OF THE EARLIEST COLONISTS IN COLORADO AND LATE RECORDER OF DENVER.

DENVER, COLORADO TERRITORY, *Nov. 21st*, 1868.

WILLIAM H. REYNOLDS, Esq. (Providence, R.I.)

DEAR SIR,

I avail myself of the first opportunity after my return from the Park of San Luis to describe to you my trip, and give at length my impressions of the Grant *so called*. You will recollect that though you had heard the Marshall Coal Bank was eleven feet in thickness, yet, when you saw it, you were as much astonished as though it were an original discovery of your own. So in the same way I have been amazed at the extent, adaptability to settlement, and value of the San Luis Grant. I have no interest in the property, as you well know, and for this reason my testimony in relation to it, and theory for its disposition, should I offer any, is of greater value. Major Whitsett's Letter.

We left Denver on the noon of the 23rd ultimo, and reached Fort Garland on the evening of the 27th, all well, and in good spirits. The roads were excellent, the air balmy, as is the rule with us here, and nothing of note had occurred. Fort Garland, as you know, is on the eastern rim of the Park, directly at the foot of the Sierra Blanca, and a few miles north of the grant. We found miners working the placers in this vicinity, and taking out considerable gold, a sample of which Mr. Fisher purchased. We remained here one day to make some repairs on our ambulance, and on the 29th rolled out. The road ran due south directly along the foot of the "range" forming the eastern boundary of the Park, and for the entire distance to San Luis was as hard as a pavement and as smooth and level as a billiard-table. On the left the Sierra rose abruptly from the plain, the division so plainly marked that literally you could have sat upon the level and leaned upon the mountain. To the right the vast park stretched out in fertile beauty to the western rim, perhaps seventy miles distant—forming the largest area of level land I have ever seen, crossing at right angles the Sangre de Cristo, Trenchara, San Luis, Culebra, and other streams. Twenty-four miles of delightful travel brought us to the town of San Luis, built along the Culebra river, having a population of about two hundred and fifty people, and situate upon the northern verge of the grant. On the 9th we started for the mines, which had been discovered by a former

Major Whitsett's Letter.

party, on the mountain side seven miles distant, and which were being cleaned out by a party of workmen sent by Mr. Fisher for the purpose. The lodes so far discovered are several in number, and included in a radius of one mile. All the ores looked exceedingly rich, and one vein was pronounced by our prospectors, who were the best to be found in Gilpin County, unsurpassed by any yet discovered in the territory. Their expression was, "This would make a big excitement in Gilpin." The ores taken away by Mr. Fisher will tell whether they were deceived by appearances. I saw some of the earth just below one of the lodes "panned out," and the yield of gold indicated very rich placer diggings. When I saw that the "range" running through the grant was a continuation of that which contains all the valuable mines yet discovered within the territory, and remembered that upon its other slope and nearly opposite were the celebrated Moreno placers, I was not astonished at the character of the ores produced or the sure indications of rich washings; indeed, I should have been astonished by their absence.

The mountains to within a short distance of their summits were dark with immense forests of pine and cedar, easily available for the manufacture of lumber for use in the park below; and I found the same formation of smaller plateaux, or "Little Parks"—level meadows of from one hundred to a thousand acres in extent, each lying in the shadow of the peaks (generally bisected by a mountain stream), and turfed with luxuriant grasses, as are common in the more northern counties. From the location of the mines, the extent and precise character of the entire grant could be seen and determined, and particularly the arable lands which were spread out at our feet. These lands can be irrigated throughout their whole extent by the mountain streams which, even at their present low stage, pour out upon the plain, through their separate channels, vast volumes of water, and which, in the growing season—their highest stage—must be abundantly sufficient for the purpose. The rapid fall of these streams affords everywhere facilities for manufacturing, and their location and course in reference to their adaptability for irrigating the plain is eminently favourable.

The soil is fertile, equal to any in Colorado, as is shown by the crops raised at San Luis, Culebra, and other settlements, and the pasturage is unsurpassed even in this territory. I am not prepared to make from view an estimate of the relative quantity of mountain upland and meadow embraced within the grant, but to the eye the proportions seem equal. The population, which I estimate at about two

thousand, or less, are contented, happy, and prosperous, and increasing rapidly by influx from New Mexico. The opening of the mines will call in an American community, who will find here a diversity of occupation sufficient for the growth and existence of a self-sustaining people. I think that as soon as the tract is open for settlement, and through proper influences, there will be an immense influx of our people, and that the Mexicans will be gradually crowded out. At present nothing could be more painful to them than to be obliged to leave their beautiful settlements. Major Whitsett's Letter.

I think that the bottom lands are worth twenty dollars per acre at the least. The value of the whole grant cannot be estimated. It is somewhat, in this respect, like a very large diamond, and again, like a large diamond, is too valuable to find ready purchasers. Certainly it will sell, when the proper time comes, "for millions." And this tempts me to give advice without being asked—always a dangerous thing to do. Don't undertake to dispose of the whole tract to any one individual or one company. No one is rich enough to buy it, and it is too big a thing for any one to have control of. I am not familiar with the extent and value of the famous estates of the world; but this one, I think, must be one of the most valuable, if not the most valuable. Certainly, ten estates could be carved out of this, each extensive enough and valuable enough to demand all the attention and all the price which any man or company could be induced to give or pay for any one piece of property.

I have written this at length, because I think you will value my disinterested opinion, and because, being astonished at the character, extent, and value of this grant, I wish to give some reasons why. I had heard of this property as you had of the coal vein; you saw that and believed. I have seen San Luis, and I believe. We came back to Denver through the Park, the Poncho Pass, and South Park, making the trip in twenty-three days. I was astonished at the size of the Rio Grande, which you know runs through the Park of San Luis, and makes for forty miles the western boundary of the grant. It is fully five times the size of the South Platte at Denver, and would irrigate the whole plain through which it runs. My trip has been delightful and instructive, and I esteem myself lucky in the opportunity. I am expecting by next mail from New Mexico the certified copies of the records that Mr. Fisher ordered. He instructed me to pay the bill for same, and draw on you, which I shall do.

Yours truly,

RICHARD E. WHITSETT.

LETTER FROM MR. BUCKLIN.

WM. H. REYNOLDS, Esq. DENVER, *Nov. 22nd*, 1868.

DEAR SIR,

Mr. Bucklin's Letter.

Thinking perhaps you would like my opinion of the San Luis Park and its surroundings, I take time now, having just returned from a most pleasant trip through the mountains and valleys of the park, and especially of the Sangre de Cristo Grant. Starting the day after you went on your journey east, we travelled on the road four days through Southern Colorado, and over the Sangre de Cristo Pass. Passing over, sighted Fort Garland, being two hundred miles from Denver. I expected, from all that I had heard, to find a hard and severe pass to go through, but was surprised to find a very easy grade and good roads, rolling down toward Garland. From the pass which is on the eastern boundary of the grant, we passed through a wild sage brush country, as Professor Hill would or did call it, but what I should call good agricultural and splendid wheat land, although I am not so well pleased with this part of the grant for agricultural purposes as with the southern portion; but there are good mines, which are most valuable.

As you will see Fisher in a few days, I will leave to him all the incidents of the road and of our journeyings, and will try and give you my idea of the Sangre de Cristo Grant, its wealth, resources, and practicability. The mineral wealth shows out plain; no country or section is superior; we find mines and ledges of all descriptions, the placers rich, and the gold of a very fine quality. I am familiar, as you know, with most of the mines in this country, and especially of Gilpin County. I will say, the mines we know of, and the indications of large deposits of quartz throughout the grant, are as good, if not better than in any section I know of. Of course there are no ledges fully developed in the grant, and we cannot tell exactly of the future prospects, but I know, from some experience, that when iron is struck it will be of the first quality; every indication shows it. I have no doubt but some of the ledges will be developed into what we call soft iron veins, which are easily worked and always rich.

We had no time to examine as closely as I should have liked; but, from what I have seen, I must say there is a great future for the mines and mining interest of the San Luis

Park. I need make no detail of the agricultural wealth, but will cover all by saying I was well over Gilpin's Grant—north, east, south, west—seeing nothing but splendid arable land, as good as any could wish to have and to farm. Irrigation will be most easy, for rivers, creeks, and brooks cross the grant in every direction. As a grazing country it can't be beat; we find everywhere the fine sweet grass peculiar to this country, which you know is equal to grain for feeding purposes. The resources of the park at present are small—we can expect nothing else now; but in a few years, when it is properly settled, we will look to that part of Colorado as the most fertile and most productive of any; the climate is milder, and everything seems to be placed in position on purpose to be used. Mr. Bucklin's Letter.

The practicability of the park is superior in every respect—I mean the access to and from the park, from all directions. We find every natural advantage in getting to it, and, once in, we find no trouble in going anywhere in any way, either on horse or in your finest carriage. We find a most easy railroad grade up and down either the Sangre de Cristo or Poncho Pass, one of which must be used to lengthen out the U. P. R. R. E. D.* toward the Pacific. In winding up, I will say the Sangre de Cristo Grant has all the advantages you could ask for, possessing all the agricultural and mineral qualities, being easy of access, and in every way good enough. The coming year will see you in Colorado again, when you can judge of the grant yourself.

I remain yours respectfully,

WM. C. BUCKLIN.

* Union Pacific Rail Road, Eastern Division.

LETTER FROM MR. C. D. HENDRON, LATE RECORDER OF COSTILLA COUNTY, IN WHICH DISTRICT THE SANGRE DE CRISTO GRANT IS SITUATED.

SAN LUIS, C.T., *Sept. 8th*, 1867.

ISAAC HARTSHORN, Esq.

DEAR SIR,

Your letter, dated Aug. 10, was received.

Mr. Hendron's Letter.

In answer to your several enquiries regarding this tract and surrounding country, I will endeavour to be as explicit as possible under the circumstances.

MINERALS.—First, as regards the *gold placers* thus far discovered on this tract, they are now worked very successfully, considering the rude means employed. The average yield is about $10 per day to the hand, but as the miners are now making preparations to work with machinery, they anticipate a yield of from forty to fifty dollars per day to the hand.

A new company has just been formed for working a new placer just discovered, which is reported to be very rich. They will probably commence operations some time this fall. I would here remark that these placers are on the Sangre de Cristo river.

Specimens of *silver and copper* ore have been found here, but as no interest is taken in working these metals, I am unable to form any definite idea to what extent, or what their value is at present, and, as I before remarked, these metals attract but little attention among the people here, as gold abounds on nearly all the streams, is more easily obtained, and consequently other minerals are neglected.

WOOL.—The cost of raising this article is comparatively very small. Ewes can be bought here for $2 per head; a boy can easily herd one thousand at a cost of $10 per month, to include board and clothing (buckskins being very cheap and durable, are made into clothing for shepherds). In the months of April and May, when the lambs are dropped, small boys are employed—say four to one thousand sheep—to take care of the young lambs. These boys are hired at about 25c. to 50c. each per day. Shearing also commences on or

about this time. The shearers receive one sheep for every hundred they shear. This is all the cost or expense a wool-grower has with his sheep. Mr. Hendron's Letter.

BEEF.—The cost of this article is about the same as that of sheep. Cattle or sheep are never fed during the winter, but thrive and fatten on the nutritious grasses which the plains and valleys afford. The grass of this country is not like that of the States. Here we have so little rain, and none whatever after the grasses are matured, that consequently the substance or nutriment is retained, and therefore becomes palatable food for stock. Neither are stock ever housed here during the winter, the climate here being too mild to render such a course necessary.

MARKETS.—There are good markets in Santa Fé, Denver, the military posts, and the mines, and not sufficient stock raised here to supply the demand.

GRAIN.—But little attention is paid to the raising of corn, although it is a profitable crop. Wheat, oats, rye, and barley grow to perfection, and the yield is enormous. Fifty bushels to one of seed is considered an ordinary yield. All kinds of vegetables grow to mammoth size, and bring a good price, being sold at from 5c. to 10c. per pound.

CLIMATE.—The climate here in winter is very mild indeed; we have no disagreeable weather, and little or no snow, except during the months of January and February, and even during these months the snow rarely ever attains a depth of more than a foot, and melts in a short time after the storms are over.

The country surrounding this tract possesses many advantages, especially that portion adjoining lying north and included within the new county of Sahwatch. This portion has many natural advantages: many thousands of acres of meadow, that produce the finest hay I have ever seen; many fine streams, which abound with the finest fish in the world; fertile lands which require no clearing. The mineral thus found is gold in small quantities. Gypsum is also found in abundance. This county is becoming rapidly settled. A flouring mill in this county would pay handsomely, being in the vicinity of the mines.

The population of the Sangre de Cristo Grant is about 1200. Of this number 100 are Americans; the rest are Mexicans, who have strange customs; they are a degenerate and priest-ridden race.

Mr. Hendron's Letter.

We have no wealthy men among us. Here, as an example, the richest man we have in this county is worth only $10,000. As regards the title to lands here, except in a few instances they are worthless.

We are never troubled by hostile Indians. The tribe inhabiting this country are Utahs, who frequently come among us trading their skins and furs. They have been at peace with us for many years.

We have grasshoppers here occasionally, but very little or no damage has been done by them.

If you would visit this part of the country next spring, I would take great pleasure in showing you everything that would be of interest to you.

I will gladly give you any information you may desire in the future if you wish it.

Truly,

C. D. HENDRON.

LETTER FROM DR. E. M'CLELLAN, POST-SURGEON OF FORT GARLAND.

Col. W. H. REYNOLDS (Providence, R.I.)

FORT GARLAND, COLORADO, *November 8th*, 1868.

MY DEAR SIR,

Doctor M'Clellan's Letter.

I am requested by Mr. Morton C. Fisher to address a note to you relating to my impressions of this county, in which I am informed you are interested, but which you have not yet visited. Of the topography of the grant you must have a general idea, but being peculiar, from the gigantic upheaving to which at some remote date it was subjected, it must be visited before its beauties can even in a small degree be realised.

That gold exists in the mountains has been demonstrated by myself and a few other officers who have discovered and developed a valuable lode in the line of mountains forming its north-east boundary. It is well known that precious metals exist throughout all the mountain ranges, while the base metals are met with in profusion. The mountains are covered with valuable timber, and nearly every cañon can furnish sites for mills and good water-power. All that is wanted to open to the world the prodigal gifts of nature in this great park is the employment of capital. Doctor M'Clellan's Letter.

The climate is delicious, although the winter is said to be severe; last summer, while all the world was melting, we had no uncomfortable day; and I believe I am correct in stating that during the past eight years but one death has occurred near this post from natural causes (*i.e.*, disease).

If there should be any points upon which you desire especial information, I will be pleased to answer any questions you may address to me.

Very respectfully, your obedient servant.

E. M'CLELLAN,

Assist.-Surg. and Bot.-Major, U.S. Army.

OPINION OF THE HON. W. M. EVARTS, ATTORNEY-GENERAL OF THE UNITED STATES AS TO THE TITLE TO THE SANGRE DE CRISTO GRANT.

I HAVE examined the public documents and private deeds upon which Governor Gilpin's title to the "Sangre de Cristo" Grant rests, and find the title free from exception. The original Mexican grant, upon the report of the Surveyor-General of New Mexico in its favour, was confirmed by Act of Congress, passed July 21, 1860. This vested a complete title in fee simple, including all mineral right, in Charles Beaubien, then the holder of the Mexican grant, and the whole estate has been conveyed by his widow and heirs to Governor Gilpin, by sufficient deeds duly recorded. Mr. Evarts's Opinion.

(Signed) WILLIAM M. EVARTS.

NEW YORK, *April 13th*, 1865.

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